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MARINE ENGINEERING of Canada

A monthly journal dealing with the progress and development of Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks, and containing a record of the latest and best practice throughout the Sea-going World. Published by

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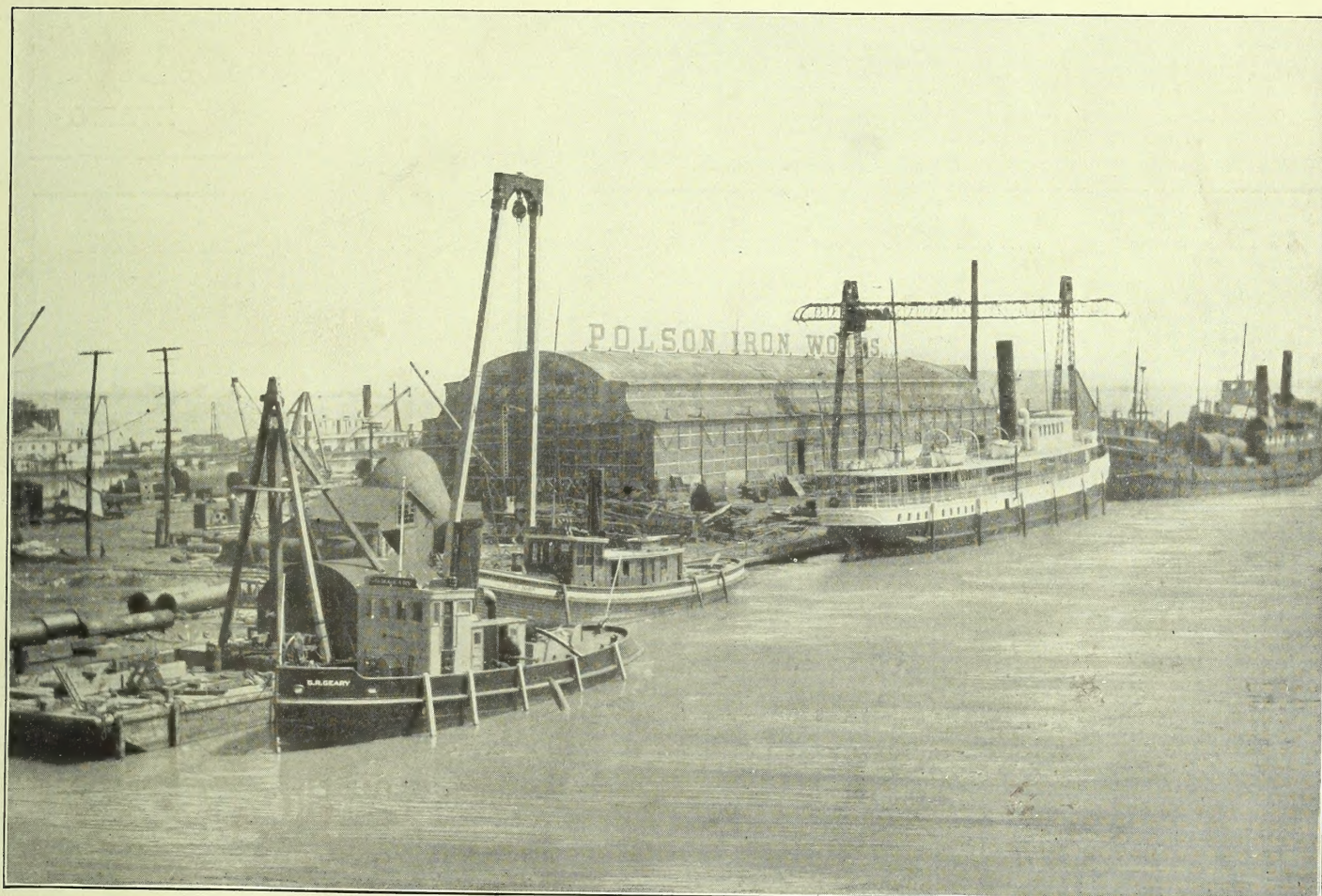
Publication Office, Toronto—January, 1913

No. I

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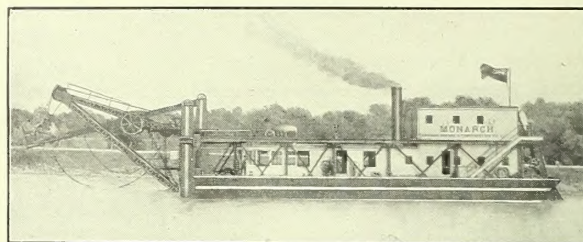


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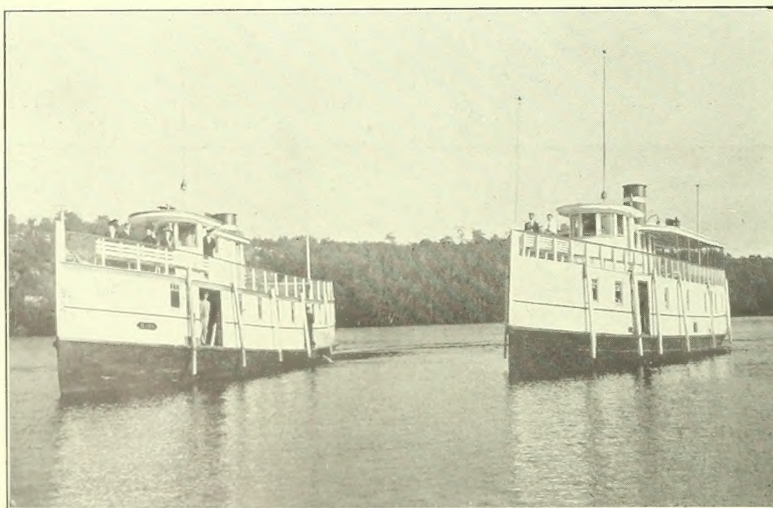
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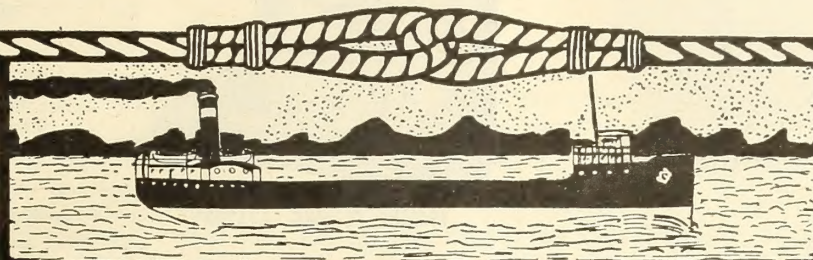
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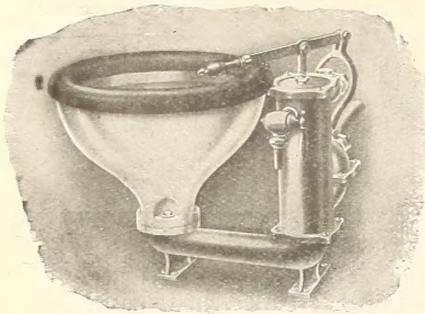
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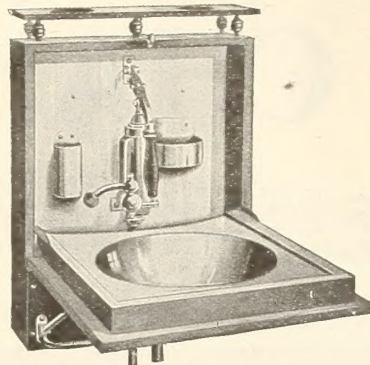
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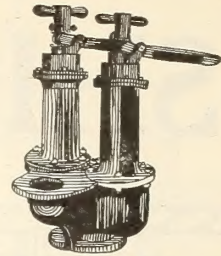
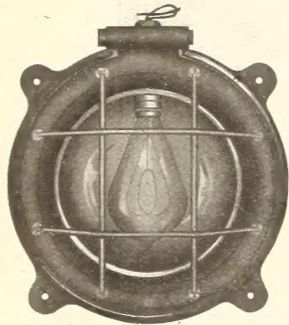
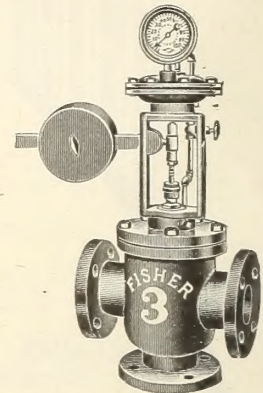
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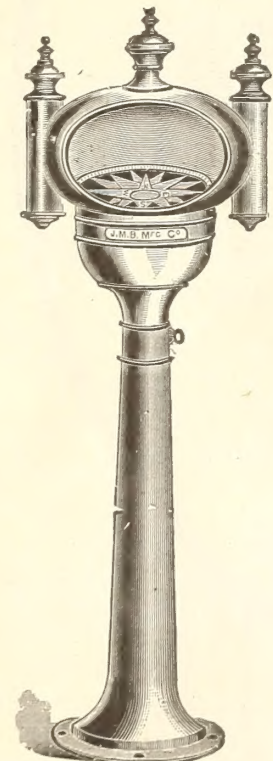
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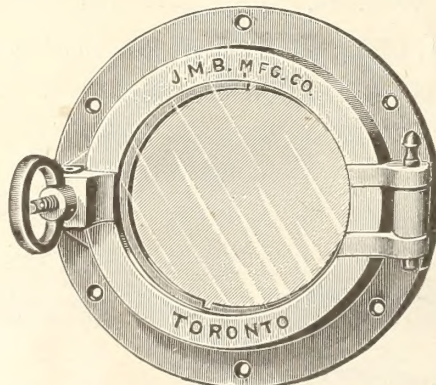
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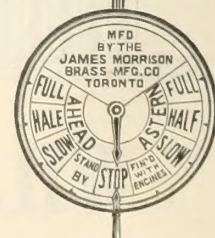
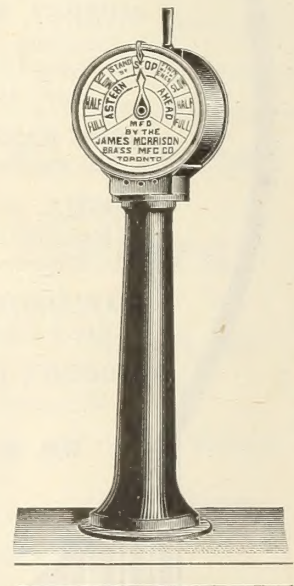
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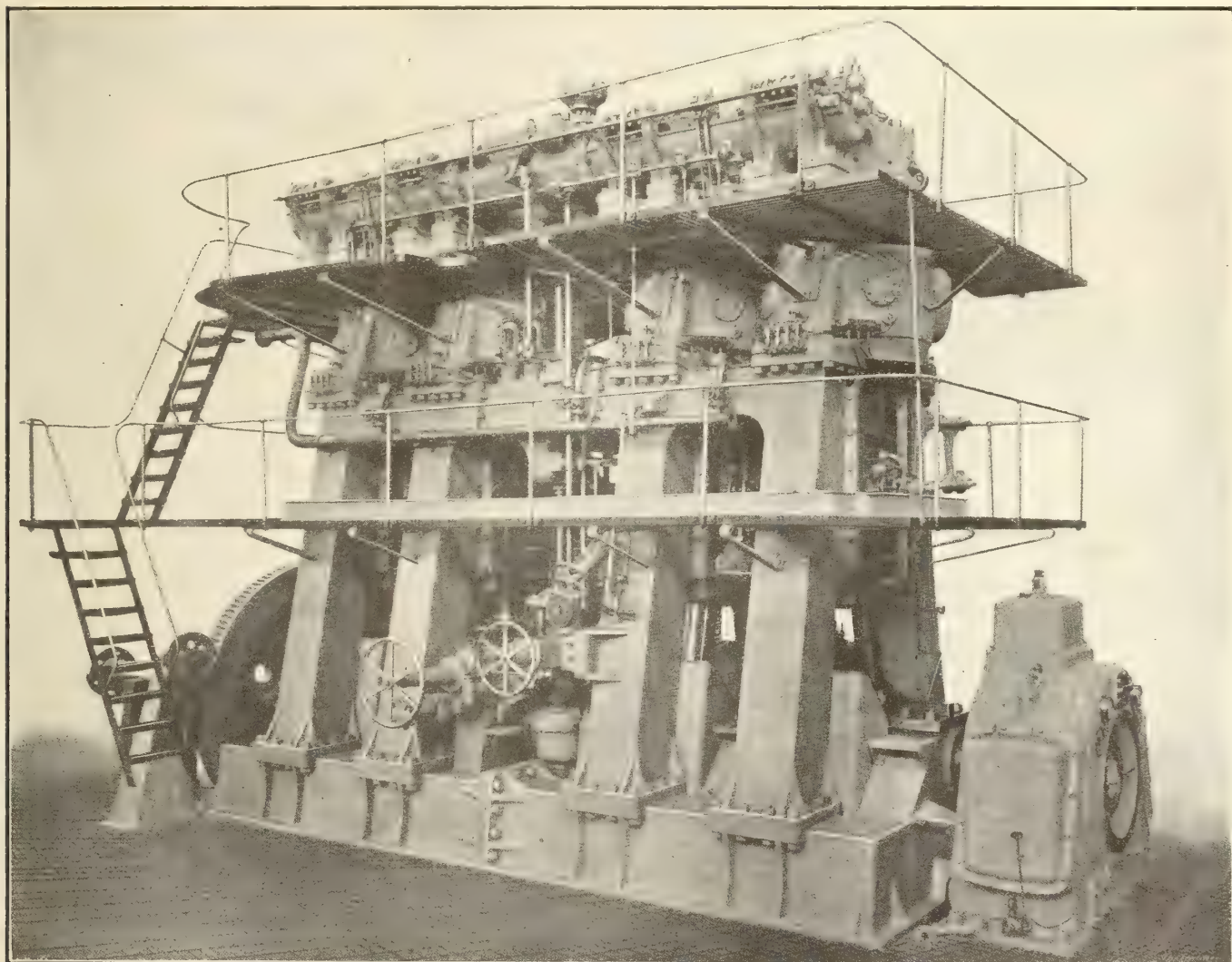
The year 1912 fully maintained in its achievement record the hopeful outlook which its dawn promised, and while in point of fact it did not surpass to any great extent its predecessor in what might be termed quantity output, it, nevertheless falls to be noted that it did so in large measure, relative to vessel types, their propulsion, equipment, and adaptability to specific services.

IN some respects there is a remarkable similarity between the shipbuilding statistics of 1912 and those of 1911. The most casual reference to the first table given in this column will show that the figures for the two years are curiously alike. Take those of the United Kingdom, for example. There is a difference of a little over a hundred in the number of vessels launched, but on tonnages of considerably over a million there is a difference of only about 4,000 tons. All over England the difference on figures of almost a million and a quarter is only about 9,000, while in this case there is even a somewhat confusing similarity between the two sets of figures—1,232,390 tons in 1912, as compared with

1,223,098 tons in 1911. In Scotland there has been an improvement in output of only some 16,500 tons, while the Clyde builders launched in 1912 just about 10,000 tons of new shipping more than they did in 1911. The large yards in Belfast had a slightly reduced output, and Ireland does not hold its usual high place in the tables; but even there the decrease is only a matter of 22,000 tons.

In the British overseas Dominions more work was done than in 1911, but the total is not very high, and although the figures from that most scattered of "districts" must needs be brought together, conditions vary so widely that no general moral can be drawn from them. In countries other than the Bri-

tish Empire the production shows an increase of about 430 in number of ships but of only about 168,000 tons in measurement, while the grand totals for the world show that there was a gain, in number of vessels of, in round figures, 380, and in measurement, of 179,000 tons. Considering that the totals run over three and a half million tons this increase is quite insignificant. It is so small indeed that it may be said of all the world, as it may be said indeed of almost every individual country and district, that 1912 just maintained the very high standard of production set by 1911, was equally busy all through, and was quite as much distinguished by evidences of prosperity



TYPICAL "DIESEL" MARINE ENGINE OF 1912. 800 HORSE-POWER "CARELS-WESTGARTIL," TWO CYCLE, OPEN UNIT. INSTALLED IN SINGLE SCREW MOTOR SHIP "EAVESTONE."

MARINE ENGINEERING OF CANADA

and enterprise. The marine engineering figures tell exactly the same tale, and, as may be seen from the table, their similarity is almost equally marked:

six distinct yards, and the production of the Tyne firm was really the record for the year. In the 1912 figures, however, there is absolutely no qualification.

a mere tonnage point of view at least, as the leading half-dozen ships of the year:

Activity on the Clyde.

It was said twelve months ago that there had never been a year in which the shipbuilding and marine engineering industries of the Clyde were so intensely interesting, or provided so much material for comment as they had done during 1911. These remarks might well be repeated now—with renewed emphasis. The remarkable elasticity of the trade, its capacity for rising to every occasion, as well as—unfortunately—for sinking at intervals into periods of depression, has never been better illustrated than during the past three or four years. At the end of 1907 the work of the year amounted to about 620,000 tons of new shipping, at the end of 1910 there were only 393,000 tons to the credit of the river, and now, at the end of 1912, there are over 640,000 tons. These somewhat violent fluctuations are in one sense regrettable, as even the times of prosperity are overshadowed by the knowledge that the ever-possible swing of the industrial pendulum will bring again a series of lean years. At present, however, there is no indication of a falling-off in trade, and the high figures representing the work done in 1912 may be taken not as abnormal or indicating an unjustified "boom," but as the legitimate result of the regular demands of the trade of the world. The firms on the river—there are exactly fifty on the list for the year—had an extremely busy time, and the result is that they improved even on the enormous output of 1911 by about 10,000 tons. The margin on the side of gain is very small, representing only a couple of tramp steamers, but it is sufficient to make 1912 the best year in the history of the river, and to show that its limit of capacity for undertaking work of all kinds has not yet been reached.

There were, as usual, many different types of vessels built in the district. So many indeed were the types and so difficult is it now to draw lines of distinction between some of them that it is hardly possible to tabulate them properly without including some vessels under more than one type. The term "turbine steamer," for instance, may mean what it meant a few years ago, or it may mean a war vessel, a "combination" engined vessel, a vessel with geared turbines, a twin screw, a triple screw, or a quadruple screw. A "motor vessel," again, may mean anything from a little launch to a big cargo carrier, or even a gunboat.

SUMMARY OF WORLD'S SHIPBUILDING.

	1912.			1911.		
	Vessels.	Tons.	I.H.P.	Vessels.	Tons.	I.H.P.
England	831	1,232,390	1,263,086	898	1,223,098	1,241,172
Scotland	520	688,188	914,711	557	671,624	834,628
Ireland	22	164,748	93,450	24	186,825	150,116
U. K. totals	1,373	2,085,326	2,271,277	1,479	2,081,547	2,225,916
Dominions	208	36,578	17,922	152	29,249	12,875
Foreign	2,049	1,648,310	1,957,606	1,628	1,480,273	2,011,663
Grand total	3,630	3,770,214	4,246,805	3,259	3,591,069	4,250,454

Clyde Still to the Front.

Were it not that the matter has been a commonplace for many years, the remarkable position occupied by the Clyde in all annual records of shipbuilding and marine engineering progress would have been considered one of the most astonishing phases of modern industrial life. The following grouping of the United Kingdom and British rivers with the two principal foreign shipbuilding countries shows better than any amount of explanation could do the long lead which the Clyde has in everything that pertains to its two great trades. It compares very favorably with the whole of Germany—with a margin of 110,000 tons on the right side—it has almost double the output of the whole of the United States—although, of course, its figures are more complete in the matter of small vessels than are those of America—its total is less than 58,000 tons short of those of the Tyne and Wear combined, and it produced during 1912 almost a third of the total tonnage of the United Kingdom, and rather more than a sixth of that of the whole world. When it is remembered that all this work was done within an estuary some twenty miles in length, much of it on a narrow river crowded with shipping, and all of it in an area that, in extent, would scarcely be noticed on the map of any country other than Great Britain, the full value of the Clyde shipbuilding and engineering industries may be faintly realized. The comparative figures from which the morals may be drawn are as follow:

	Vessels.	Tons.	I.H.P.
United Kingdom	1,373	2,085,326	2,271,277
The Clyde	389	640,529	878,326
Germany	408	530,312	646,025
The Tyne	97	388,376	464,855
United States	196	321,592	321,208
The Wear	82	309,934	191,806
Tees and Hartlepoons	100	261,888	182,210

Another Tyne Record.

The Tyne has many shipbuilding records to its credit, and its tonnage figures for 1912 include still another. For the second time Messrs. Swan, Hunter & Wigham Richardson, of Wallsend and Walker, launched within twelve months a larger tonnage than that of any other individual firm. In 1906 their total of 117,943 tons was exceeded by that of the American Shipbuilding Company, but that "combine" had then in operation

firm's production consists of the lifting capacity of floating docks, but no reasonable deduction on account of these would reduce their figures to those of the next highest, so that their position is unsailable. It must be pointed out also that in this comparison we have used their exact Board of Trade tonnage of measured ships, so that no deductions can be made for "erections." Their "with erection" figures are of course considerably higher:

LEADING SHIPBUILDERS.

	Vessel	Tons
Swan, Hunter & Wigham	Rich'son	21
The Vulcan Company (2 yards) ..		11
Workman, Clark & Co.		10
William Doxford & Sons		18
William Gray & Co.		20
Harland & Wolff		7

Clydebank's Record Production.

The i.h.p. of marine engines produced by Messrs. John Brown & Co., of Clydebank, is easily the largest for the year, and larger also than that of any firm in any previous year. The work of the six leading firms in 1912 was, however, remarkable all over. In each case the total i.h.p. was more than 100,000, while if the limit had been put at that figure, Messrs. Cammell, Laird & Co., of Birkenhead, who had 101,350 i.h.p., would also have been included. The year was indeed notable for the very large amount of work done by most of the leading firms of marine engineers:

LEADING MARINE ENGINEERS.

	I.H.P.
John Brown & Co.	178,500
F. Schichau	143,700
Vickers (Limited)	136,750
North-Eastern Marine Co. (3 shops) ..	129,125
The Wallsend Slipway Co.	123,000
Krupp's Germania Works	121,750

World's Largest Ships.

There is really only one "large" vessel in the 1912 list—the Hamburg-American Company's Imperator, built by the Vulcan Company in their new yard at Hamburg. The second largest—the White Star liner Ceramic at Belfast—would have been a very large ship a few years ago, but she is small now by comparison with the present largest. The following may be considered, from

SUMMARY OF LARGEST SHIPS, 1912.

Vessel	Type.	Builders	Tons.
Imperator—4 screw turbine		The Vulcan Company	52,000
Ceramic—3 screw "combination"		Harland & Wolff	18,500
Empress of Russia—4 screw turbine		The Fairfield Company	16,850
Empress of Asia—4 screw turbine		The Fairfield Company	16,850
Nesbitt—Twin screw		Workman, Clark & Co.	14,500
Niagara—3 screw "combination"		John Brown & Co.	13,342

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while of barges, lighters, and such craft there is more variety than ever.

New World's Records.

There are two clear world's records in Clyde marine engineering for 1912. In the first place nothing like 878,000 i.h.p. has ever been turned out before in one year in any single recognized shipbuilding district, least of all in a district so small geographically as that of the Clyde.

The second record is an individual one. Messrs. John Brown and Co.'s output of 178,500 i.h.p. is not only the largest in the world for the year, but it is also the largest which has ever been manufactured in one year by one firm. The next highest on record is that of the Vulcan Company, of Stettin, in 1911—166,250 i.h.p. The work of the Clydebank firm is all the more remarkable, as they are the only Clyde company who have i.h.p. of six figures to their credit for 1911 and 1912.

There is no danger whatever in predicting that—if there is no trouble about labor—the year 1913 will be quite as busy as were 1912 and 1911. There is far more tonnage on hand than there has ever been, and as the shipping trade continues in a satisfactory condition, there is every reason to believe that there will be many new contracts in the market during the coming months.

Scottish Shipyards.

All over Scotland the shipbuilding and marine engineering firms were busy throughout the year, and the full returns of work done show that while 520 vessels were launched, as compared with 557 in 1911, the tonnage was 688,188, as compared with 671,624, and the i.h.p. 914,741, as compared with 834,628. These figures indicate a decrease of 37 vessels and increases in tonnage of 16,564 and in i.h.p. of 80,113. There was a very slight decrease in the production of tonnage in Aberdeen and Moray Firth yards, but there were increases on the Clyde, the Forth, and the Tay, and prospects generally are good in all the districts. The table below shows the work done by Scottish builders in 1911 and 1912:

English Shipyards.

All over the English shipbuilding districts there was a steady year's work, very much on the lines of that of 1911, and, although some centres did more business relatively than others, the total figures are very much the same as those

of the previous year. There was a reduction of about 70 in the number of vessels launched, an increase of over 9,000 tons in measurement, and an increase of about 20,000 in horse-power, but on figures running to a million and

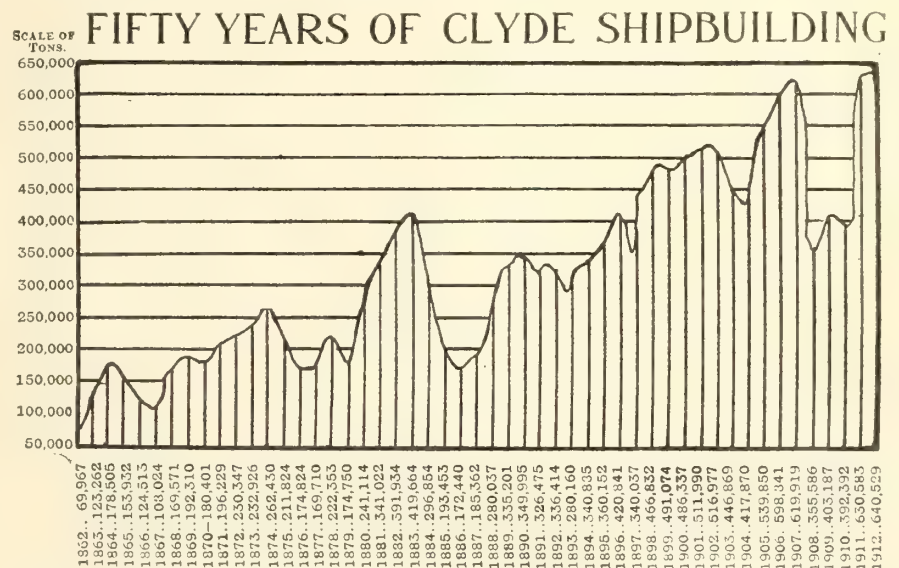
24,206 tons. The decreases were, however, only on the Tyne and at Tees and Hartlepool yards, the Wear production showing an increase. Of the other districts there were increases on the north-west coast of England, on the Humber,

SUMMARY OF ENGLISH SHIPBUILDING.

	Vessels	1912 Tons	I.H.P.	Vessels.	1911. Tons.	I.H.P.
The Tyne	97	388,376	464,855	126	418,325	421,060
The Wear	82	309,934	191,806	86	286,834	193,343
Tees, Hartlepool	100	261,888	182,210	134	279,245	160,640
Mersey-Solway	128	139,601	243,480	128	84,085	245,649
Humber	131	48,495	62,970	117	44,966	55,770
The Thames	120	14,319	16,860	167	38,504	72,751
English Channel	130	11,931	101,635	97	8,829	90,974
Bristol Chan.	39	3,761	170	36	3,050	985
Dockyards	4	54,085	.....	7	59,260	.....
	831	232,390	263,086	898	1,223,098	1,241,172

a quarter these are scarcely perceptible, and the fact that the output was so similar in amount to that of 1911 is the best possible testimony to the sound condition of the industry generally. There seemed to be abnormal activity during that year, so much so that it would not have been surprising if there had been

at English Channel and Bristol Channel yards, and a large decrease on the Thames, while the Royal Dockyard tonnage shows a slight decrease. The above table shows the production of tonnage and horse-power in the different English districts as compared with those of 1911



FLUCTUATIONS OF CLYDE SHIPBUILDING TONNAGE SINCE 1862, SHOWING CLEARLY THE DECLINE OF 1908, THE IMPROVEMENT IN 1909, THE SLIGHT DECREASE IN 1910, AND THE GREAT INCREASES IN 1911 AND 1912.

a sudden if moderate reaction. Instead the activity has been proved quite justified, and even in the great north-east coast district, which feels first and most severely any falling off in the demand for cargo-carrying tonnage, there has been only a slight reduction in output—about 24,000 tons all over the Tyne, Wear, Tees, and Hartlepool. The production of these three districts amounted to 279 vessels of 960,198 tons, as compared with 346 vessels and 984,404 tons in 1911—a decrease of 67 vessels and

Tyne, Wear and Tees.

Busy though the Tyne was all through the year, it has not equalled its 1911 output. In this respect it has not kept pace with its great competitor on the west coast. The decrease, however, is not serious, and it is made up for to some extent by a substantial increase in the horse-power of the engines constructed.

The yards on the Wear improved on their 1911 figures by about 13,000 tons, and they have on hand sufficient work to keep them busy well down through the coming year. Prospects are indeed exceptionally good on the river, and the future of the district is all the more promising by reason of the fact that Messrs. Swan, Hunter and Wigham Richardson are to start shortly a new yard at South-

SUMMARY OF SCOTTISH SHIPBUILDING.

	1912		1911	
The Clyde	389	640,529	413	630,583
The Forth	32	19,054	31	11,319
The Tay	28	17,388	31	17,303
The Dee, etc	71	11,217	82	12,419
	520	688,188	557	671,624
		914,741		834,628

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wick for the construction of small vessels.

Like the Tyne, the Tees and Hartlepool districts experienced a slight setback as compared with the previous year, the decrease in its case amounting

The plant, on which some \$500,000 is being expended, is designed for the construction of vessels of from 300 to 800 tons, for which, with the growth of British Columbia, there is an increasing demand. Except for some Government

tonnages in 11 and decreases in only 3. This in itself is sufficient proof that trade was good on the average, and that the shipping of the world continues to demand more and more carrying capacity. It must be remembered of course that war vessels are included in all the figures, and that the exclusion of these might enable a slightly different moral to be drawn with regard to several individual countries, but the broad fact that mercantile shipbuilding had a good year would not be affected. The total output recorded in our returns shows an increase of 421 vessels and 168,037 tons over that of last year.

United States—American shipbuilders have had a comparatively busy year, judging only by their returns of work done, which show an increase of about 53,000 tons and 60,000 i.h.p. It may be noted, however, that the increase is explained very largely by the fact that a battleship and a large collier were launched at the Brooklyn and Mare Island Dockyards respectively, whereas in 1911 no war or other vessels were floated from the Government establishments. The work of the group of yards associated under the name of the American Shipbuilding Company has been decreasing for several years back, and this year vessels were launched at only three of the establishments. A few years ago there were seven, all building lake freighters, and the firm almost invariably had the largest American tonnage, while several times they had the largest output in the world. This year the work of the Newport News Company is easily the largest turned out by United States firms, but the other leading companies also have to their credit good records of work:—

Germany—German shipbuilding has been exceptionally interesting recently, principally because it is competing with that of Great Britain in every department of the industry. The Hamburg-American liner Imperator, which was launched in May in the presence of the Kaiser, is returned by the Vulcan Company as of 52,000 tons and 54,500 i.h.p. How this compares with the large Cunarder Aquitania at Clydebank cannot be stated as yet with any confidence; but in the mere matter of size there is not likely to be much to choose between the vessels.

SUMMARY OF IRISH SHIPBUILDING.

	Vessels	1912. Tons.	I.H.P.	1911. Tons.	I.H.P.
Workman, Clark & Co.	10	85,391	53,400	66,399	51,800
Harland & Wolff	7	77,591	39,300	118,209	96,916
Dublin Dockyard Co.	4	1,641	—	1,976	—
The Larne Company	1	125	—	241	—
MacColl & Company	—	—	750	—	1,400
	22	164,748	93,450	186,825	150,116

to about 18,000 tons. There was, however, an increase in the horse-power turned out by the marine engineering shops, and all over the work of the year was very satisfactory.

Irish Shipyards .

There are no records in the Irish figures, neither of the Belfast firms having a very high tonnage.

British Dominions.

There is a new name this year in the list of shipbuilders in the scattered dominions of the British Empire—that of the Western Shipbuilding Company of Port Arthur, Canada, who made a good

work at Sorel, on the St. Lawrence, steel shipbuilding in Canada is still confined to the lake ports of Ontario. The yards are at Kingston, Toronto, Collingwood, and Port Arthur. The demand for lake tonnage increases with the development of the prairie provinces, and during 1912 the lake yards had all the new work and repair work that they could handle. The newest of the lake yards is at Port Arthur. The first vessel was launched there in June. It was designed for lake and canal service—for the package and grain trade. At Port Arthur, where there is a dry dock in which the largest vessels in service on the lakes can be overhauled, there was under construction

BRITISH COLONIES' SUMMARY.

	Vessels.	1912. Tons.	I.H.P.	1911. Tons.	I.H.P.
Burn & Co.	34	7,098	2,320	6,558	710
Western Drydock & Shipbuilding Co. 3		6,694	—	—	—
John King & Co.	67	5,970	150	2,384	940
The Collingwood Shipbuilding Co....	5	4,607	4,300	10,779	4,950
Hong Kong & Whampoa	8	1,392	—	—	—
C. Brown & Co.	10	1,305	—	—	—
Morts Dock Co.	3	1,087	2,860	—	940
Tanjong Pagar Co.	15	816	1,270	1,187	1,360
G. T. Davie & Sons	1	800	—	—	—
The Shalimar Works	10	707	72	337	85
United Engineers	12	491	275	398	473
Polson Iron Works	9	468	775	—	—
Morrison, Sinclair & Co.	3	462	—	357	—
W. S. Bailey & Co.	15	391	—	290	307
J. Macgregor & Co.	1	240	1,000	149	—
D. C. Mulhall	3	321	—	145	—
Other firms	9	3,731	4,900	6,665	3,120
	208	36,578	17,922	29,249	12,875

start with a total of nearly 7,000 tons. There is another new name—that of the United Engineers, Limited, Singapore; but as this firm have taken over the works of Messrs. Riley, Hargreaves and Co., they do not represent a new yard.

So far only one steel ocean-going vessel has been built at the Canadian maritime province ports. This vessel was launched at New Glasgow in 1908. Since then there has been much discussion of proposals for shipyards at Sydney, Halifax and St. John. At one time tonnage bounties were expected from the Government, and later much was expected from the naval policy of the Laurier Government; but 1912 ended without any progress having been made in the revival of shipbuilding in the maritime provinces. Towards the end of the year, however, work was begun on a new shipbuilding plant at Coquitlam, near Vancouver.

at the end of the year a passenger and package freight steamer, which will be the largest vessel of the fleet of the Northern Navigation Company.

Foreign Shipyards.

Of the 14 foreign countries in which shipbuilding is done there were increased

SUMMARY OF FOREIGN SHIPBUILDING.

	Vessels.	1912. Tons.	I.H.P.	Vessels.	1911. Tons.	I.H.P.
Germany	408	530,312	646,025	336	418,882	704,235
United States	196	321,592	324,208	160	268,561	257,825
Holland	705	258,263	112,859	480	178,618	101,730
France	112	177,883	254,595	106	184,411	324,225
Japan	272	89,925	180,851	206	87,304	164,935
Austria-Hungary	22	83,192	89,910	54	68,390	48,485
Norway	100	53,256	58,273	81	38,222	41,004
Italy	62	35,617	201,865	48	88,814	148,520
Denmark	37	27,622	18,605	32	18,961	18,040
Belgium	18	21,329	9,215	38	12,489	1,798
Spain	10	20,372	37,750	6	6,760	10,800
China	63	13,057	8,260	48	4,222	3,920
Sweden	21	12,286	10,680	20	9,734	16,931
Russia	23	3,604	4,510	13	94,905	169,215
	2,040	1,648,310	1,957,006	1,628	1,480,273	2,011,663

MARINE ENGINEERING OF CANADA

France—The French shipbuilding industry is passing through a definite phase in its history, the outcome of which may be its establishment on a better economic basis than it has had in the past. The work of the year, so far as tonnage was

terest. The growth of the trawling industry is well shown by the large number of trawlers floated.

Holland—An exceptionally large amount of work has been done recently in Dutch shipyards, and the figures

most interesting of the vessels launched was probably the United States transport steamer Merritt by the Shanghai Dock and Engineering Company, but a much larger vessel, the Kiang Wah, was launched at the Kiangnan Works.

SUMMARY OF AMERICAN SHIPBUILDING.

	1912.			1911.	
	Vessels.	Tons.	I.H.P.	Tons.	I.H.P.
Dockyard warships	2	46,360	35,200	—	—
Newport News Co.	12	61,242	62,100	16,061	18,950
American S.B. Co.	13	38,015	25,460	45,174	25,060
Maryland Steel Co.	6	36,680	24,000	14,142	750
New York S.B. Co.	13	34,123	39,550	53,056	53,500
Great Lakes Works	8	18,603	10,100	30,994	10,960
Fore River Co.	4	12,780	18,900	39,397	52,650
American Car Co.	17	11,232	—	8,862	—
W. Cramp & Sons Co.	16	10,737	31,400	32,519	43,850
Harlan & Hollingsworth ..	6	9,191	9,100	3,718	8,425
Toledo Shipbuilding Co.	4	6,567	5,370	2,990	4,500
United Eng. Works	6	4,957	4,250	990	1,640
Manitowoc D.D. Co.	3	4,807	—	780	—
Craig Shipbuilding Co.	3	3,900	4,100	2,183	—
The Seattle Co.	9	3,424	4,510	—	—
Staten Island Co.	8	2,875	2,100	4,844	3,800
Union Iron Works	2	1,870	1,250	1,679	2,600
Johnston Brothers	3	1,850	—	2,580	—
Bath Ironworks	2	1,484	24,000	757	2,650
Dialogue & Sons	4	1,071	2,350	1,341	3,260
Pusey & Jones Co.	2	950	2,200	700	—
D. M. Swain	2	700	950	—	—
F. S. Bowker & Son	1	556	—	565	—
The Dubuque Works	1	500	600	—	—
Gas Engine Co.	40	235	1,000	472	5,430
Other firms	9	6,883	5,368	4,757	13,400
W. & A. Fletcher Co.	—	—	10,350	—	6,400
	196	321,592	324,208	268,561	257,825
DOCKYARD-BUILT SHIPS.					
Vessel and Type.	Dockyard.		Tons.	I.H.P.	
New York—Battleship	Brooklyn		27,000	28,000	
Jupiter—Tur.-elec. collier	Mare Island, Cal.		19,360	7,200	
Total—Two vessels of 46,360 tons and engines of 35,200 i.h.p.					

concerned, was confined largely to the three firms who have each two yards and to the yard of the Chantiers et Ateliers de France, Dunkirk.

Italy—There is a great reduction in the Italian tonnage; but as we are without any return from the firm of Odero, of Genoa, this may to some extent account for the apparent falling off. There is, however, a large decrease in the work of the Ansaldo-Armstrong establishment at Sestri Ponente, and also in the tonnage launched from the Royal Dockyards. The i.h.p. for the year is exceptionally high, principally by reason of the fact that Zoelly turbines for three powerful destroyers were completed at Legnano.

Norway—Perhaps the largest increase in tonnage relatively is reported from Norway, where the figures have risen from 38,000 to 53,000. All the firms were busy, and a number of vessels which almost if not quite reach the limit possible in the yards were built. The great majority, however, were steam whalers for home owners, but for service in other than home waters.

Japan—The most notable launch of the year in Japan was that of the cruiser Hiyei at the Imperial Dockyard at Yokosuka. A sister of the Barrow-built Kongo, but with all material (as far as possible) made in Japan, she is a very remarkable achievement. In the building of merchant vessels there has been a good volume of work, but no ship of outstanding in-

show a considerable increase on those of 1911. The work is also even more varied than in previous years, the "oil engine" figuring much more frequently in the returns than it did, although of course motor vessels have been built and engined in Holland for a good many years back.

Russia—The enormous decrease in the Russian tonnage is easily accounted for. Four dockyard-built battleships were launched in 1911, while the only new war vessel floated in 1912 was a submarine at Nicolaieff. The two principal yards are well employed, principally with naval orders, but apart from these there is not much work.

Denmark—Oil-engined ships are—naturally—a feature of the Danish shipbuilding returns. Vessels of this type built at Copenhagen have probably done more to bring the marine oil engine prominently before the public than anything else, and in 1912 two more were launched from Messrs. Burmeister and Wain's yard.

Spain—One of the new Spanish battleships—the Espana—has been launched at Ferrol, and a gunboat, a torpedo boat destroyer, and four torpedo boats at Cartagena. At Bilbao a passenger and cargo steamer of 8,000 tons—the largest yet built in Spain—is being constructed.

China—The three Shanghai firms in China have been busy recently, and have all improved on their 1911 records. The

FREIGHT RECORD THROUGH SOO CANALS.

MORE than ten million tons greater than the record of 1910, the previous best was the volume of freight carried through the canals at the Soo during the 1912 season, as shown in the statistical report just issued. While shipments of practically every commodity except soft coal show an increase over the three previous periods, the movement of iron ore, 46,303,423 tons, was greater by more than 4,699,789 tons, than in 1910, the season showing the greatest previous shipments.

Wheat.

The movement of wheat, 174,086,456 bushels, was 60,832,895 bushels greater than in 1909, while the total grain shipments show a gain of 12,505,095 bushels over the record of that year.

Coal.

Although the movement of hard coal was delayed in starting by mine difficulties early in the season, the shipments, 2,142,485 tons, were 82,276 tons greater than the previous high record of 1911. The movement of soft coal, amounting to 12,789,109 tons, was 483,558 tons below 1911, due chiefly to delay in getting the product from the mines to the loading docks owing to car shortage.

Lumber.

Lumber shipments were 667,542,000 feet, a gain of 64,441,000 feet over the high record of 1910.

Passenger Traffic.

Passenger traffic shows a considerable falling off, the number carried through the canals, 66,877, having been 56 fewer than in 1910, and showing a loss of 13,074 or 16 per cent., compared with 1911. For this, the unseasonable cold weather early in the year is held chiefly responsible.

An order in council has been passed amending the harbor regulations of Canada, and prohibiting the discharge or disposal of oil, tar or other dangerously inflammable material in the waters of any harbor of the Dominion. The order provides for a fine of \$50 for violation of its provisions, with a further penalty of \$10 for every twelve hours during which the offence continues.

CANADIAN SHIPBUILDING DEVELOPMENT.

IN view of Canada's offer of three super-dreadnoughts, the keels of which will, however, have to be laid down in the United Kingdom, it is of interest to note that very soon it will be possible to build ships in the Dominion as, according to all accounts, good progress is being made with the creation of the necessary establishments. Indeed, there are many competent authorities who do not hesitate to say that in the near future some of the finest vessels for the British Navy and mercantile marine will come from the Dominion.

Yard at Sydney, C.B.

The most important enterprise of the kind is associated with Sydney, Cape Breton, where the British-Canadian Shipbuilding Co., in which both the Fairfield Co., Govan, and Messrs. John Brown & Co., Clydebank, are interested, is now laying down plant. A site covering some 300 acres has been acquired, and, as a result of a plebiscite of the ratepayers, the municipal council has granted the company a bonus of 1,000,000 dollars in return for which, however, several important conditions have to be observed.

There are to be eleven slips, while the manufacture of guns, gun mountings and armour-plate will also be undertaken. In addition, there is to be a dry dock 1,150 feet long and 135 feet wide, with a depth on the sill at high water of 45 feet. Sydney, it may be mentioned, is the headquarters of two of the largest coal and steel companies in the Dominion, one of the latter having facilities for the production of 250 tons of pig-iron and 1,000 tons of steel daily, so that there will be an abundance of raw materials at hand.

Yard at St. John, N.B.

At St. John, N.B., where big harbor works are being carried out by Messrs. Norton, Griffiths & Co., the plans include a graving dock 900 feet long. It is also proposed to make provision for a huge shipyard, the firms of Messrs. Cammell, Laird & Co. and of Messrs. Vickers, Ltd., being prominently mentioned in this connection. The latter are, however, at present busy with operations at Montreal, where their floating dock, 700 feet long with a lifting capacity of 25,000 tons, is now available. According to the charter, the company has the right to manufacture steel in all its branches, and to transact general business as shipbuilders and repairers.

Further, on the Pacific Coast, at Esquimalt, B.C., Messrs. Denny Bros., of Dumbarton, are interested in a graving dock and shipbuilding company, which is to receive payment at the rate of 3½ per cent. for 35 years on an estimated

expenditure of \$2,500,000 for the construction of a dry dock 900 feet long, 122 feet wide, and 40 feet deep, while the building and repairing of ships will, it is expected, give employment to between 3,000 and 4,000 men. Other yards are being established at Vancouver and at Sault Ste. Marie.



ARCH PRINCIPLE OF SHIP CONSTRUCTION.

A PAPER entitled "Some Notes on the Arch Principle of Ship Construction," by Mr. Maxwell Ballard, was read before the North-East Coast Institution of Engineers and Shipbuilders. The author said that in principle the arch system was an innovation in the form of the upper structure, and a reversion to web frame construction, consisting as it did of strengthened arched girder frames at regular intervals reinforcing the intermediate usual framing. Below the position of the normal moulded depth there was no alteration in structure from the ordinary. However, in lieu of the usual deck at this position, with a bridge or shelter deck erection thereon, the structure consisted of a transverse arch. The upper and lower abutments of the arch formed the termination of the horizontal and vertical spans of flat structure of the deck and sides respectively, and, in combination with the other structural arrangements, afforded the necessary support to resist the stresses. The framing was regulated by the span of flat side in conjunction with the structural arrangements, while the total depth of girder was taken in considering the length

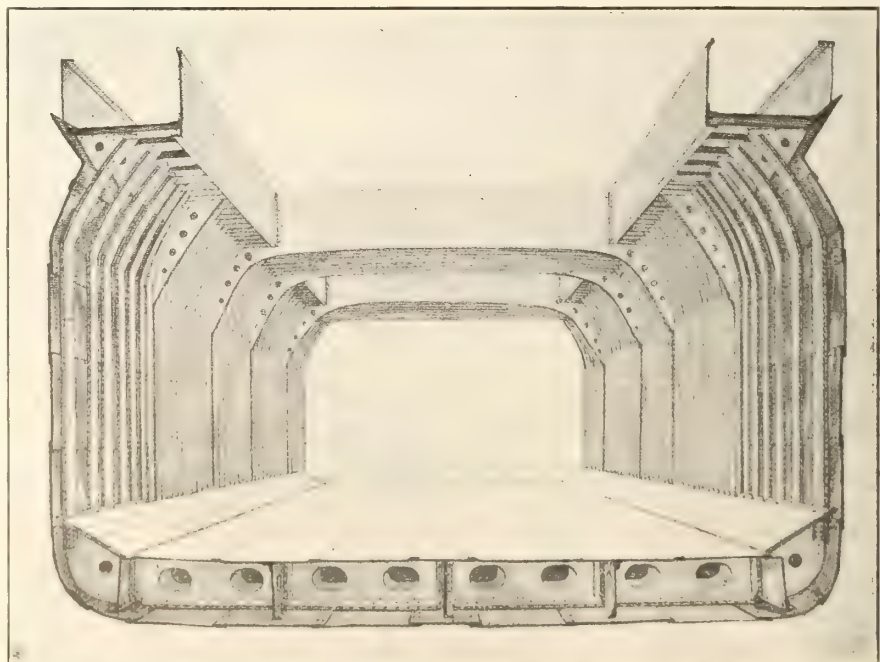
proportions for scantlings. By the frame head knees being arranged outside the framing, and by carrying the plating back, the deck area was maintained and the capacity for stowage improved.

Question of Sheer.

Longitudinally, it was preferred to give a reverse sheer of moderate amount to the structure. This was not, however, essential to the design, and the vessel might be constructed straight or with ordinary sheer if desired. The theoretical advantage and practical disadvantage of reverse sheer being well known, it was necessary only to indicate the manner in which the latter had been turned to advantage. The arch deck height practically corresponded to the bridge or shelter deck height, and owing to this increased height of weather deck, the reverse sheer, which was moderate in amount, did not bring the deck down to the highest point of the ordinary sheer line at the forecastle front. This longitudinal camber being only some 2 ft. or 3 ft. for accessibility and navigation, the deck was to all intents and purposes level, and the camber formed a desirable means of draining water to the scuppers. At the extremities of the vessel, forecastle and poop erections were constructed, though this was optional in the case of the latter. Any arrangement of accommodation desired might be fitted to suit the owner's requirements, and a bridge erection for passengers or cargo could, if desired, be constructed.

Behavior at Sea.

After briefly outlining the results of technical investigations into the arch



ARCH PRINCIPLE OF SHIP CONSTRUCTION (AYRE BALLARD PATENT).

principle of ship construction as regards transverse and longitudinal strength, reserve buoyancy and freeboard, the author gave some details regarding the behavior of arch vessels at sea. Theoretical considerations would indicate that, owing to the massing of weight amidships in conjunction with the longitudinally redistributed structure, the pitching and vertical motions would be favorably affected and reduced relatively to ordinary vessels. Further, owing to the vertical distribution of cargo and the transverse form, a reduction in rolling might be expected. It was anticipated that, in view of the preceding, and also of the increase in freeboard, together with the absence of "wells" to fill with seas, the vessels would be more dry and comfortable sea boats and main-

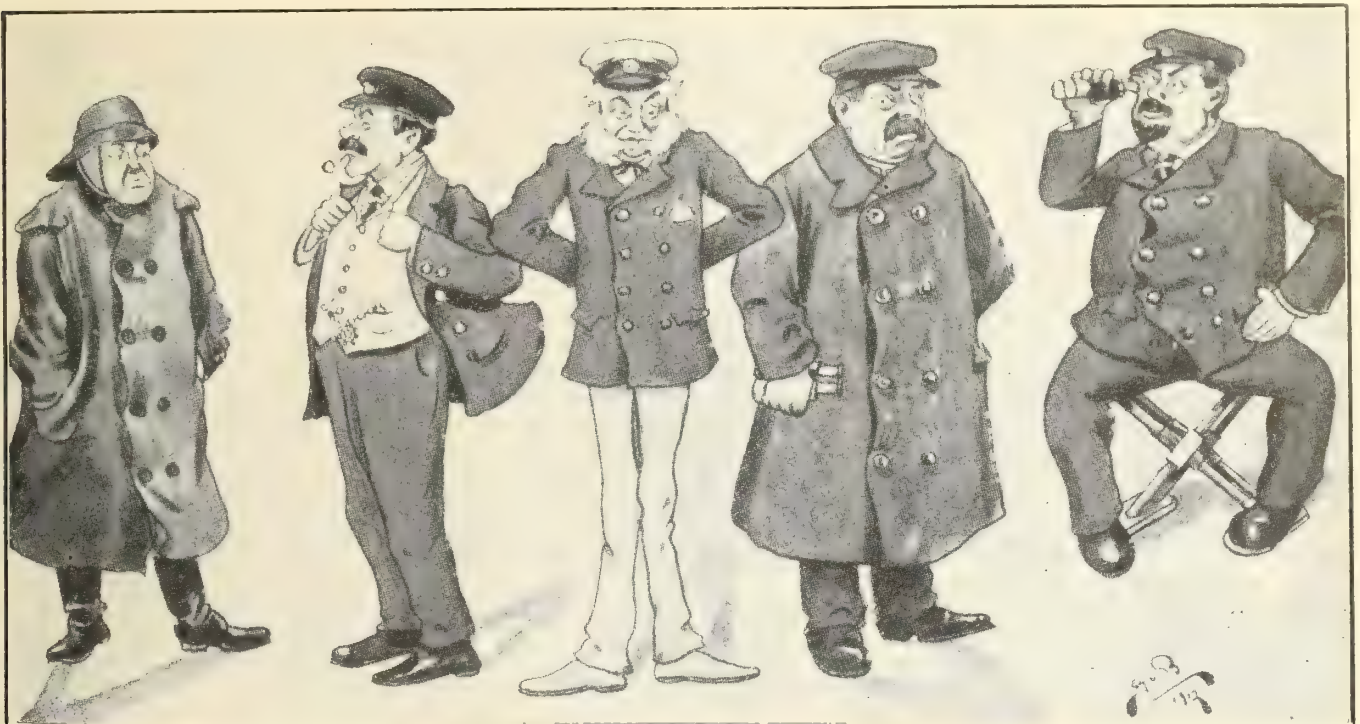
movement and gentle behavior well supported the captain's remark that the Edenor was the best sea boat he had ever been on. As proof of his confidence and practical belief in the seagoing qualities of the design, the author mentioned that he crossed from Libau in the early months of last year in the Edenor without any webs in the hatchways to support the covers.

Commercial Considerations.

As regards the commercial side of the arch design, he made a comparison with ordinary types of vessel in two ways, the draft, speed and specification being identical in both:—(1)—Upon the basis of the same deadweight carrying power, and (2)—upon the basis of the same dimensions. Estimates had been made em-

duction of scantlings, which were up to full rule requirements, but through redistribution of material, by which the whole elements of design were so affected as to permit of a reduction in the dimensions. The saving in capital outlay was further increased by a reduction in cost of propulsion and maintenance, both of which were due to the reduction in dimensions previously mentioned. The power was less on account of the lessened displacement of some 400-450 tons. The coal consumption works out at some 5 per cent. less for the same deadweight earning power. The saving in maintenance and running cost effected should run proportionately with the dimensions of the vessels.

As compared with both the ordinary types of vessel, the hold capacity of the



By arrangement with

PILOTS WE HAVE MET.

"The Siren and Shipping"

tain their sea speed better. Reports from captains served to confirm the opinion that in the arch type there was distinctly less pitching and 'scending than in vessels of the ordinary design. This was most noticeable when the vessel was laden with a more or less homogeneous cargo, such as coal.

While the writer anticipated a reduction of pitching, he did not expect an appreciable improvement in rolling motion. Experience, however, showed that the rolling motion was most easy, and there seemed to be an actual reduction. In heavy weather the author has caused the vessel laden with coal to be put beam on to seas for the purpose of measuring the rolling and noting the effects, and under these trying conditions, the steady

bracing comparisons between a three island type vessel, a vessel which was practically a shelter decker, and one of the arch design. The basis for all the figures was the three islander, and while the actual total figures were not of primary importance, the differences had been gone into with extreme carefulness and were as agreed to by a local firm of shipbuilders. The vessels selected for the comparison were of about 6,200 tons deadweight upon a draft of 22 ft. 6 in. and speed of 9 knots.

Owing to the economy in the distribution of material in the arch type, whereby a large saving was effected, a smaller vessel was required to fulfil the same requirements as to deadweight. The saving of material was effected not by re-

arch vessel was considerably increased in spite of the reduced dimensions. This was undoubtedly a commercial gain for some trades—particularly colliers, in which about 2 to 2½ cu. ft. per ton increase was given in under-deck capacity. The erections, however, added a large amount of capacity to the vessels, and taking the total capacity there was a decrease as compared with the ordinary vessel; but it should be pointed out that in actual trading the difference was not that indicated, for there was better stowage in the arch design on account of fewer obstructions.

In dealing with the second comparison, upon the same dimensions, vessels of typical collier and Baltic size had been selected, the figures again being

strictly relative. The comparative figures for the two vessels of the three island type and the arch design showed a saving in weight of material of about 15 per cent., giving, of course, the corresponding increase in deadweight of between 4 and 5 per cent.; this was extremely important because it involved a reduction in capital outlay and interest, and afforded greater earning power. In the writer's opinion it was particularly desirable for the special conditions of the coal trade, where in normal times the profit on the amount of coal handled was relatively small. It would be noted that the ratio of deadweight to net tonnage was improved while the hold capacity was increased. The latter again indicated that the arch design was not merely a deadweight carrier.

“EMPRESS OF RUSSIA” AND “EMPRESS OF ASIA.”

IT is announced that these two fine turbine-driven quadruple-screw mail and passenger steamers, now completing by the Fairfield Shipbuilding and Engineering Co. for the Canadian Pacific Railway Co.'s Pacific service, are to sail on April 1 and May 27. The vessels are to proceed to the Far East via the Suez Canal; and as they are each of about 15,000 gross tonnage, they will be the largest steamers which have so far used the canal. The “Empress of Russia” and “Empress of Asia” are to take up their future service at Hong Kong, and passengers going out by them will have the opportunity of returning home across Canada via the Canadian Pacific Railway, and thence by the same company's mail steamers to Liverpool, thus encircling the world.

INDICTMENT OF QUEBEC PILOTS.

THE Shipping Federation of Canada has taken a strong stand on the matter of an investigation of the pilotage system between Quebec and Father Point as a result of a report made to that body by Captain H. E. Webb, marine superintendent of the Hudson Bay Steamship Company, lately returned from a voyage to the Arctic on the steamer Beothic. The report has created a sensation in shipping circles, inasmuch as it relates the startling fact that the Beothic while travelling 160 miles in perfect weather conditions, was twice driven ashore. Pilot Plante was at the time in charge of the vessel. The damage sustained in the second mishap was considerable. The officials of the Hudson Bay Co. are particularly incensed about the matter, and have de-

termined to give all possible information to the Government on the matter.

Log of the Beothic.

The story from the log of the Beothic as related by Captain Webb is that the steamer was driven ashore twice within twelve hours. She left Quebec on September 18th. The weather was fine and clear, and the machinery and steering gear in perfect order. At 2.45 p.m., while steaming at a rate of about twelve knots, the ship went ashore near Madame Island. The bottom was of a soft clayish nature there, and the ship's hull was not damaged.

The grounding occurred shortly before low water, so that by waiting until 7.45 p.m. for high tide, she was floated without assistance. She continued on her voyage, and when nearing Hare Island, about 60 miles above Father Point, at 1.15 a.m., September 19, went ashore again on a rocky bottom. Had the vessel not been built for the Arctic she would have, in Captain Webb's opinion, been completely wrecked. As it was, her strong plates were considerably torn, but because of the urgency of her mission with loads of supplies for Hudson Bay posts, she was unable to return to Quebec, and after she had been released at high tide at 7.30 a.m. was obliged to proceed leaking.

The Beothic is at present at St. John's Nfld., having returned from the Arctic. An estimate has not yet been made of the damage she sustained, but it is known to be heavy.

STRICTER STEAM BOAT INSPECTION.

IT is reported that one of the results of Commissioner R. A. Pringle's inquiry into the recent sinking of the steamer Mayflower, near Barry's Bay, will be an amendment of the regulations governing the inspection of steamboats, making the law more stringent. The inspection of inland shipping under the act at present is somewhat lax, and, in the case of the Mayflower, the faulty position of the engine, it is asserted, could have been foreseen. Resulting vibration loosened the boat's caulking.

19 LAKE VESSELS WERE LOST.

NINETEEN vessels were lost on the great lakes last year, an exceptionally small total, according to the annual report of Wm. Livingstone of Detroit, president of the Lake Carriers' Association, which was read recently. Loss of life was also small as compared with former years. The report said 33 persons were drowned or killed, and of this

number, 16 were of the crew of the schooner Rouse Simmons, the “Christmas tree” ship, which left Northern Michigan for Chicago last November, and was undoubtedly destroyed during a storm on Lake Michigan. Thirteen of the ill-fated ships were steamers, three were barges, two were tugs and one a schooner. The most important loss was the steamer James Gayley, which sank in collision with the steamer Rennselaer on Lake Superior. The combined loss of cargo and ship was about \$300,000.

Mr. Livingstone said the year of 1912 on the great lakes “had shattered every precedent,” and “the business outlook for 1913 left little to be desired so far as the prospective volume is concerned.”

SHIPBUILDING AMALGAMATIONS.

THE agreement which has been arrived at between Messrs. Barclay, Curle & Co., of Glasgow, and Messrs. Swan, Hunter & Wigham Richardson, of Wallsend-on-Tyne, whereby the two concerns will become, for all practical purposes, one organization, represents a form of working understanding which has come into much favor within recent years. It exists between Messrs. Harland & Wolff, of Belfast, and Messrs. John Brown & Co., of Clydebank; between the Fairfield Shipbuilding & Engineering Co., of Glasgow, and Messrs. Cammell, Laird & Co., of Birkenhead, and to pass from shipbuilding to shipping, between Messrs. Henderson Bros. (the Anchor Line), of Glasgow, and the Cunard Co., of Liverpool. It is not similar, however, to the bargain made between Messrs. Harland & Wolff and the London & Glasgow Shipbuilding Co., of Glasgow. In that case, the Clyde firm was absorbed by the Belfast company, although the yard is still known locally by its old name.

Messrs. Barclay, Curle & Co. are one of the oldest and best known of Clyde shipbuilding firms. At present they have over 80,000 tons of new work on hand, and when their yard at Elderslie is in full working order their average annual output in times of normal trade should be about 50,000 tons. They will continue to build their larger vessels in their old yard at Whiteinch and will lay down their smaller ships at the Elderslie establishment, which they acquired early in 1912 from the trustees of Messrs. John Shearer & Sons. At present they are laying down there one of the smaller type of British India liners.

Mr. Hugh A. Allan, chairman of the Allan Line Steamship Co., has joined the Committee of the British Corporation for the Survey and Registry of Shipping.



VANCOUVER SHIPMASTERS MEET.

APPRECIATION of what has been done by the Dominion Government to provide aids to navigation in British Columbia waters, was freely expressed at the annual meeting of the Vancouver Shipmasters' Association, January 3. Among those present were Captains J. L. Anderson, Newcomb, Wilbur, Smith, Dawe, Best, Donald, Lindall, Anderson, Stewart (hon. sec.), Nichol, Tantle, Irvine, Gunn and McLennan. Captain Anderson presided and Captain W. G. McLennan was elected president in succession to Captain L. Rogers.

Aids to Navigation.

After reviewing the year's work of the association, Captain Stewart submitted the twelfth annual report, which stated in part:

"Many matters have been dealt with throughout the year. Foremost among these have been additional aids to navigation, which are of paramount assistance to our members in these new waters, and which will materially assist them to more successfully carry out their profession in these dangerous and narrow channels of our coast. We have achieved much as regards lights, fog signals, buoys and marks to guide the mariner, and I must say that the government has done good work of late in establishing the necessary aids, as recommended. In fact, we think they have even excelled of late, seeing that they have but a limited and not over modern equipment for dealing with such a large seaboard as we have in British Columbia.

Mariner's Work More Difficult.

"We are aware of the increased passenger and freight traffic, which has recently taken place on our northern coast, and this, together with competition for it, has called upon the master mariner to do in the darkness of the night what was previously done during daylight. We do not wish it to be inferred that the mariner cannot do his work during the night, but we think any reasonable person will agree that such work cannot be done so easily nor with

the same degree of safety as in daylight. An error in judgment cannot be called a criminal act, even although the consequences may be serious, if the mariner has exercised a reasonable amount of care in his attempt to carry out his arduous profession.

Must Go On Fighting.

"It is clear to us that we must continue in the good work and point out from the practical observations and experience of our members all those aids necessary in order to minimize possible danger of the sea. We memorialized the government on other matter, of which you are all aware, and although we succeeded in some cases, we have others still to keep on with, and it is our duty to patiently continue our work and endeavor to get all we possibly can that will protect and advance the profession. Our membership has been increased during 1912 by the addition of twenty new members, and that is an excellent addition for a port like Vancouver. Our finances are in good shape, and we cannot but be impressed with the satisfactory results of the past year."

COQUITLAM SHIPBUILDING YARDS

THE machinery to be used at the yards of the Coquitlam Shipbuilding Company has been delivered by the Pacific Machinery Company, having come by scow from Seattle to Swenzisky's Landing at the end of Pitt River Road. The machinery, the value of which is about \$22,000, is now being placed in position. It is of the most modern type, having a capacity of 25,000 to 30,000 feet a day. It will be driven by four electric motors, using 450 horse-power, the electricity being obtained from the Western Canada Power Company, who are now engaged in constructing a 12,000-volt line to the yards. Poles have already been erected for this purpose along the roads from the company's main cable lines at Kingsway, along Broadway and down Harbor Street to the wharf.

Mr. L. D. Shafner anticipates that

after sawing up enough lumber to complete the saw mill and other buildings in the yard, he will be able to begin the actual construction of his first ship, which will be about 125 feet long. Lumber is being obtained at St. Mary's Heights, and in addition to the limits already acquired there, Mr. Shafner has let a contract to clear all streets on the property of the Terminal Company in that region, the logs to be brought down on the miniature railway now laid down to the yards along Pitt River Road.

VICTORIA'S SURPRISING ASSERTION.

THE "Victoria Colonist" makes this unique claim: The development of the port of Victoria continues in ever-increasing ratio. No more striking figures of the growth of Canada's Pacific Gateway can be found than those which tell of the shipping inward and outward here, making this by all odds, the first port in the Dominion.

For the month of December there was a total of 845 vessels and 665,261 tons of foreign and coastwise shipping at this port, making the figures for the nine months of the fiscal year as follows:

Foreign—	Vessels.	Tonnage.
In	1,525	1,465,974
Out	1,401	1,482,704
Total	2,926	2,948,678
Coastwise—		
In	2,698	1,938,336
Out	2,855	1,767,852
Total	5,553	3,706,188
Grand total	8,479	6,654,866

Already the figures for three-fourths of a year are close on the heels of the whole previous fiscal year, and when a comparison is made with so modern a date as the twelve months from April 1, 1909, to March 31, 1910, it will be seen that the record has been far surpassed. For the latter complete year, which itself was far in advance of any former year, the grand total showed 7,254 vessels and 4,826,769 tons.

WILL ALLOW PONTOON RAFTS.

THE Committee of the British Board of Trade appointed after the Titanic disaster to enquire into life-saving appliances, has issued a report in which it is stated that an "unswampable" self-emptying lifeboat which provides adequate shelter is the ideal appliance for life-saving at sea, but as provision for such craft is impossible in the majority of cases, the committee says they have had to consider the competitive merits of other types.

While the deck lifeboat practically fulfils the requirements, it is less handy for conveying passengers from ship to ship than the ordinary open boat. In foreign going ships, where the boat accommodation is large, the committee recommends that pontoon rafts should be allowed, provided that the passengers carried by this do not exceed 25 per cent. of the total aboard such a ship. It is added by the committee that the risk of panic in small excursion steamers is very great, and that it would be lessened by the provision of buoyant deck seats or similar appliances.

STIGMA ON THE ST. LAWRENCE.

BELIEVING that as a result of the numerous accidents occurring to shipping on the St. Lawrence, the route has received a material setback, Mr. E. N. Lewis, M.P. for West Huron, has prepared a resolution which he will submit to Parliament, reading as follows:

"That whereas navigation of the Gulf and River St. Lawrence has been unsatisfactory, but can be made absolutely safe barring negligence; therefore, in the opinion of this House, a committee of the House should be appointed forthwith to investigate the system of and aids to navigation now in use on the St. Lawrence River and Gulf of St. Lawrence, and a comparison made of same with those now in use on the Great Lakes and connecting rivers therewith a report to be made of such investigation at the earliest possible date."

In this connection, a circular has been sent out to all interested in shipping on the St. Lawrence, showing that recent accidents on that river have given the route a serious setback in the eyes of marine insurance men in the Old Country, and that the proposed reduction in rates will also receive a serious setback.

Buoying of the River.

The circular also raises the question as to whether the St. Lawrence is as well buoyed as the inland rivers connecting with the Great Lakes, where comparatively few accidents happen in those congested and narrow parts. The circu-

lar asks whether the system of buoys is better on the inland rivers or whether the lake captains, being their own pilots, make themselves more familiar with the channels and thus avoid disasters. Spar buoys, it is suggested, might be used on the St. Lawrence in addition to the gas buoys, or by sufficient permanent marks on the shore.

Grain Export.

"When one considers," the circular continues, "that the amount of grain carried this year from the port of Montreal exceeds very little the total amount of grain carried fifteen or twenty years ago and that 43 per cent. of our grain goes by the port of Buffalo, the matter of the safety of the St. Lawrence is one that should receive careful attention, for what is the use of building new canals and endeavoring to concentrate the grain trade to this port if the outlet to the ocean is such a hazardous one that the rates of insurance are so high that the shippers are forced to ship by other routes. If it is the fault of the pilots that are now given sole charge of the vessels entering into this port and out again, would it not be cheaper to the country to pension off all the pilots and take off the restrictions that now require a pilot to bring the vessel up or take it down the river, and leave the matter optional to the vessel owners themselves."

ISHERWOOD SHIPS.

A TOTAL of 240 vessels, representing 1,078,151 gross register tonnage, were, or are being, built by 56 firms of shipbuilders for 79 firms of owners from September, 1907, to the end of last year. In the United Kingdom there are 145 vessels on the Isherwood system at work, representing 710,671 tons; in the United States 53 vessels, of 201,137 tons; in Germany 22 vessels, of 109,197 tons; in Holland 10 vessels, of 26,386 tons; in Canada 5 vessels, of 15,800 tons; in Belgium 4 vessels, of 11,460 tons; and in France 1 vessel, of 3,500 tons. Of the oil tank steamers contracted for last year, the majority are of the Isherwood type, and up to the present, 81 vessels of this class have been built, or are in course of construction, in the following countries:—In the United Kingdom, 52 vessels of 291,553 tons; in Germany, 12 vessels of 69,200 tons; in the United States, 15 vessels of 38,850 tons; in France, one vessel of 3,500 tons; and in Canada, one vessel of 2,400 tons.

During the past year, 46 vessels, aggregating about 211,886 gross register tons, were completed, included in this number being the passenger liner *Vestris*, built at Belfast and representing the latest addition to the fleet of Messrs. Lamport and Holt, of Liverpool; the

12,500 tons d.w. intermediate liner *Maidan*, built at Port Glasgow for Messrs. T. and J. Brocklebank, of Liverpool; and the 11,000 tons d.w. ore carrier *James A. Farrell*, built at Lorain for the Pittsburg Steamship Co., of Cleveland, Ohio, for service on the Great Lakes. This last vessel is one of two duplicates of the *William P. Palmer* ordered by the same owners. The two 13,000 tons d.w. colliers *Orion* and *Jason*, built at Sparrow's Point, Maryland, for the naval department of the Government of the United States, are also on the Isherwood system.

EXPECT ICEBERGS IN FEBRUARY.

THE iceberg season, which began unusually early last year, the first drift of bergs appearing to the vision of high latitude skippers, mostly in command of oil tankers, in January, may begin next month. The hydrographic experts say in the January pilot chart that "field ice may be expected about February 1." It may come before, however, the fierce north-westerly gales of December contributing to the ice movement toward the steamship lane. The Hydrographic Office at Washington announced recently, having in view the possibility of the ice coming down lower than normally, that the southerly tracks beginning on January 15 and ending on August 14, when all fear of bergs is past, would be slightly lower than the present winter tracks, but away south of berg danger.

The Hydrographic Office has had a conference with the steamship representatives, and they have agreed to have their commanders cross, when westbound, 47 degrees west longitude, in 41 degrees north latitude; eastbound skippers will cross 47 degrees west longitude in 40 degrees north latitude. This is in pursuance of the suggestion of Captain Jamison, of the American liner *St. Paul*.

The new lanes will be more comfortable in the bitter early months of the year, as much colder weather and heavy gales will be avoided. The new routes are not so slow as those adopted just after the Titanic disaster, but they are subject to change in case ice comes down in unusual quantity later. The impression of navigators is that the bergs will be numerous this season because of the heavy weather that helps to detach them from the glaciers.

Warning to Steamers.

The ice season is supposed to begin in earnest in April, but sometimes bergs have drifted pretty close to the lanes in the latter part of March. The American Hydrographic Office, in a red-lettered notice at the top of the January pilot chart, says:—

"Steamers are warned not to use the northern routes which heretofore were used during the period from August 24 to January 14 when bound east, and from August 15 to January 14 when bound west."

The office also says in the notice that the routes adopted for the season beginning in the middle of this month and ending in August are the "regular southern routes, standard since 1898."



LAKE STEAMER "EASTON."

THE Canadian Lake steamer Easton, here illustrated, was built last year by the Sunderland Shipbuilding Co., to the order of J. & J. T. Matthews, Toronto, Ont. She is of the single deck type, and takes the highest class of the British Corporation for her particular service.

Her leading dimensions are: Length, B.P., 250 feet; breadth, 42 feet 6 inches, and depth 18 feet 6 inches. Deck-houses are placed aft over machinery, with sun deck above, and over the top-gallant forecastle is fitted a Texas house. The vessel is fitted with clear holds for the carrying of grain in bulk, and is built with deep cantilever frames in order to dispense with pillars. Accommodation for captain and owner is provided in house on forecastle deck and for officers and engineers aft, whilst the sailors and firemen are berthed in fore end of boiler room casing. The saloon is in a deckhouse at the after end, and is fitted up in polished hardwoods. A complete installation of electric light is fitted, and all living rooms are heated by steam. The deck machinery consists of four steam winches, steam steer-

ing gear, and direct steam capstan windlass.

The main engines are by the North-Eastern Marine, Eng., Co., Ltd., Sunderland, and have cylinders 17 inches, 28 inches and 46 inches diameter by 33-inch stroke, steam being supplied by two large boilers working at a pressure of 185 lbs. per square inch.

The Easton is the most recent of a large number of vessels constructed by the Sunderland Shipbuilding Co. to the order of the Matthews Co., and since crossing the Atlantic and going into commission last fall, has proved herself a valuable addition to their fleet.



WHERE SAILORS ARE SCARCE.

HARDLY ever before were sailors known to be so scarce, it being almost impossible at the present time for vessels at New England ports to secure crews, says the Kennebec Journal. White crews seem to be a thing of the past on board the larger sized coastwise craft, and the colored sailors who of late have been filling their places seem to be drifting into other pursuits. Many of the latter secured places as firemen on board steamers at the time of the unsuccessful strike of the Coastwise Union last May, and have held on to the jobs ever since. At any rate, very few of them have been seen in this port of late, and, despairing of getting a crew here, the owners of the schooners Clarence H. Venner and Malcolm Baxter, jr., have engaged the Boston tug Baxter to tow the two vessels to Philadelphia, where they are under charter to load coal. The tug will get \$625 for the tow.

CARTHAGENIAN'S NARROW ESCAPE.

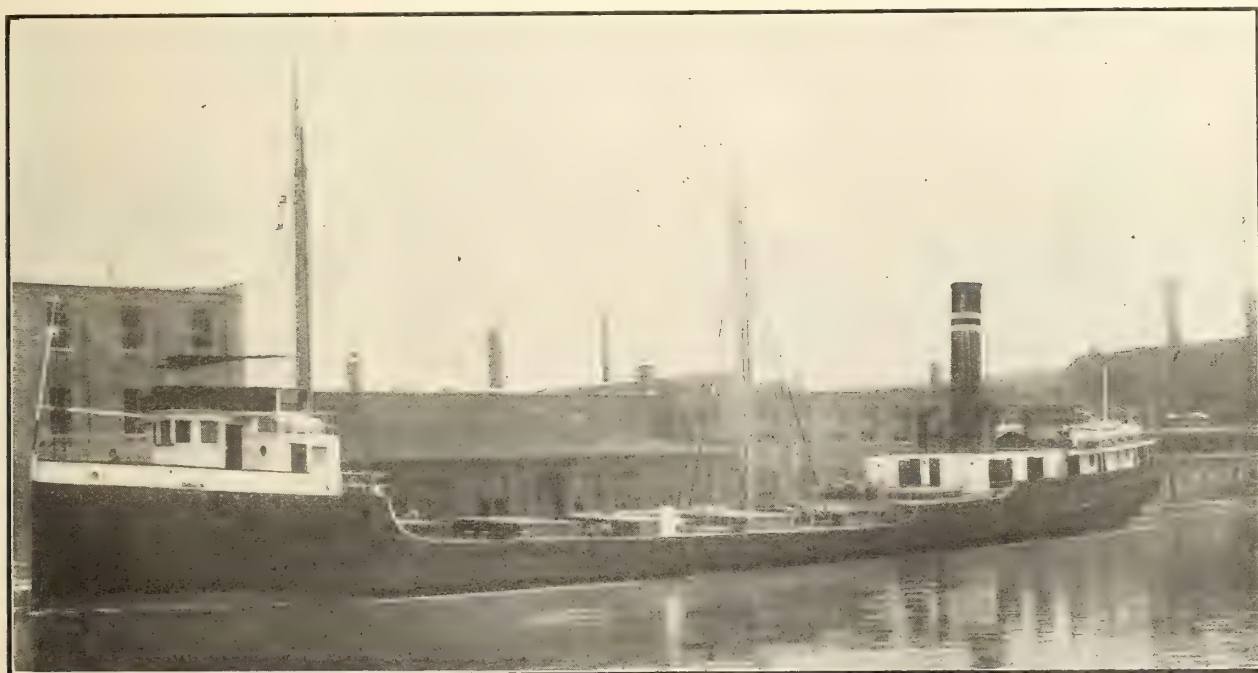
A NARROW escape from destruction from fire was reported by the Allan Line steamer Carthaginian, which arrived at St. John's, Newfoundland, January 11, from Liverpool. The steamer left Liverpool December 28 for St. John's, Halifax, N.S., and Philadelphia. Captain McKillop said that when she was three days out, her cargo caught fire in some unexplained manner. The flames spread so rapidly that it was necessary to pump an enormous amount of water into the vessel to drown them out. The fire was finally extinguished, but for twelve hours the water was knee-deep on the lower deck. It is estimated that repairs to the vessel will cost \$10,000. A large part of the general cargo was damaged.



GREATEST SIDEWHEELER AFLOAT.

THE passenger steamer Cee-and-Bee, built for the Cleveland and Buffalo Transit Co., of Cleveland, and launched recently from the Wyandotte yard of the Detroit Shipbuilding Co., is the largest sidewheeler in the world. The vessel is of the following dimensions: Length over all, 500 feet; extreme beam over guards, 97 feet 8 inches; depth of hull, moulded, 23 feet 6 inches.

Her crank shaft and piston rods are among the largest forgings ever built in the United States. Her guaranteed speed is 22 miles an hour, from dock to dock, and to make it she will develop twelve thousand horse-power.



CANADIAN LAKE STEAMSHIP "EASTON."

Built to the order of J. & J. T. Matthews, Toronto, by the Sunderland Shipbuilding Co., Sunderland, England.

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H. V. TYRRELL, Toronto - Business Manager
PETER BAIN, M.E., Toronto - Editor

OFFICES:

CANADA

Montreal—Rooms 701-702
Eastern Townships Bank
Bldg.

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140 S. Dearborn St.

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No. 1

CHICAGO DRAINAGE CANAL DECISION.

ON January 11th, the Hon. Henry L. Stimson, U.S. Secretary of War, issued his reply to the application of the Sanitary District of Chicago for leave to divert additional water, for sewage purification purposes, from Lake Michigan. As was confidently anticipated by all who had any real knowledge of the points at issue, Chicago's petition was refused for reasons which Secretary Stimson sets forth in his report. He states that he reached the following conclusions:

First:—That the diversion of 10,000 cubic feet per second from Lake Michigan, as applied for in this petition, would substantially interfere with the navigable capacity of the navigable waters in the Great Lakes and their connecting rivers.

Second:—That being so, it would not be appropriate for me, without express Congressional sanction, to permit such a diversion, however clearly demanded by the local interests of the sanitation of Chicago.

Third:—That on the facts here presented, no such case of local permanent necessity is made evident.

Fourth:—That the provisions of the Canadian treaty for a settlement by joint commission of "questions or matters of difference" between the United States and Canada offer a further reason why no administrative officer should authorize a further diversion of water, manifestly so injurious to Canada, against Canadian protest.

The application of the Sanitary District was for permission to divert 10,000 cubic feet of water per second,

in place of the 4,167 cubic ft. at present allowed them. The petition was an entirely selfish one and naturally met with strong opposition from the shipping interests on the Great Lakes. Counsel for the Sanitary District was unable to contest the evidence that so large an increased diversion would seriously lower the depth of water in all the Lakes, putting forward only the really childish argument that such a reduction was of no consequence, because of the well-known fact that wind and other natural causes produce even greater changes of depth. The Chicago scheme would, of course, have only magnified this trouble.

Observations during the last 46 years show that such a drain would reduce the lake levels from 4.8 inches on the St. Lawrence River to 6.9 inches in Lake Huron and Michigan, at mean lake levels, the lowering effect being much greater at low water periods when the additional shortage would be most keenly felt. This reduction, it is said, would substantially injure all the American and Canadian harbors on the Great Lakes, and at Montreal, the river level probably would be lowered 12 inches. The United States has spent over \$90,000,000 on these harbors, and the Canadian Government has improved over 50 of its harbors, which would suffer. Reconstruction of the American and Canadian canals might even be necessary owing to the reduction of the depth of water over the sills.

Secretary Stimson's report further asserts that the application rested solely upon the alleged sanitary needs of Chicago that even the projected deep waterway from the Great Lakes to the Mississippi would require not over 1,000 cubic feet of water per second, and that a greater flow would be dangerous to navigation and threaten overflow. With the claim of the vital interests of the city on one side, and the broad interests in the nation's commerce on the other, Secretary Stimson expresses grave doubt as to his authority to grant such a permit without the direct sanction of Congress. He is not persuaded that the amount of water applied for is at all necessary to the proper sanitation of Chicago. The evidence indicates to him that at bottom the issue comes down to one of cost, and that Chicago's problem of sewage disposal, though larger, is the same as that which confronts all the rapidly growing lake cities. He is satisfied that it would be possible in one of several ways to at least so purify the sewage of Chicago as to require very much less water for its dilution than is now required in its unpurified condition.

The proposition to erect compensating works to maintain the lake levels is declared to be entirely within the purview of Congress, and furthermore, this could only be done by joint consent of Canada. Speaking of the Waterways Treaty of 1909, Secretary Stimson says:—"The treaty contains provisions in its Article 10 by which any questions or matters of difference arising between the high contracting parties involving the rights, obligations, or interests of the United States or of the Dominion of Canada, either in relation to each other or to their respective inhabitants, may be referred for decision to an international joint commission established by the said treaty. The hearing before me brought forth the fact that the Government of Canada regards the proposal contained in this application as one which affects the material interests of that country. The establishment by formal treaty between the two countries of a tribunal with jurisdiction to decide just such questions seems to me to afford an additional reason against the assumption of jurisdiction to decide the question by an administrative officer of one of those countries."

MARINE NEWS FROM EVERY SOURCE

Quebec—Tenders addressed to Mr. Raoul Renault, secretary-treasurer of the Quebec Harbor Commission, will be received up to January 31, for the removal of from 2,500,000 to 5,000,000 cubic yards of materials, chiefly sand, down to a depth of from 35 to 47 feet below low water.

Vancouver—According to a wireless message, the steamer Cheslake, Captain Coles, of the Union Steamship Company, capsized at Vanda, Tuxedo Island, 60 miles from here, on January 7, four lives being lost.

Quebec—The steamer Arctic will be utilized as a lightship next summer and be stationed at Traverse. In the meantime the engines and machinery will be removed. The Arctic will be refitted with new machinery, and in the summer of 1914 will be despatched to the Hudson Bay in connection with construction work.

St. John, N.B.—A falling off is reported in lumber shipments from St. John, N.B., during 1912, and is attributed to the great demand for tonnage and the high freights for general merchandise. Shipments from St. John to trans-Atlantic ports fell to 82,040,963 superficial feet, against 125,237,141 in 1911.

Wireless on Fishing Vessels—The French Government is planning to grant a bounty to each fishing vessel equipped with wireless apparatus and an annual allowance for maintenance.

Ice-Breaking—An ice-breaking steamer built in Sweden for the Russian Government has successfully cut its way through ice fields 30 feet thick with only half its normal power.

H. M. S. Natal—The British cruiser Natal, which brought home the body of Ambassador Whitelaw Reid, will remain in port two weeks to repair the damage she suffered on the passage from Portsmouth.

S. S. Olympic—The provision of an inner skin of a completely novel type has been included among the alterations to the White Star liner Olympic. The work is nearly complete, and the vessel will resume her sailing early in the spring.

Echoes of the Titanic Disaster—Claims exceeding \$10,000,000 for loss of life due

to the sinking of the Titanic, have been filed in court against the White Star Line. One woman claims \$1,000,000 for the loss of her husband.

British Shipbuilding Combine.—We are informed that Messrs. Swan, Hunter and Wigham Richardson, Ltd., shipbuilders and engineers, Wallsend and Newcastle, have joined interests with Messrs. Barclay, Curle & Co., Ltd., the shipbuilding and ship-repairing firm, of Whiteinch, Glasgow. The two firms have made an exchange of shares with a view to ensure community of interests. The names of the two companies and their management remain the same as formerly.

Terry Turbines.—The United States Navy has ordered four 10-k.w. Terry turbine driven sets for use on a destroyer.

Montreal.—The contract for an addition to the Harbor Commissioners' elevator No. 1, whereby 2,600,000 bushels of grain may be handled instead of a million bushels as at present, has been let to the John S. Metcalf Co. for \$600,000. Work on the additions will proceed as fast as possible in order to be ready to cope with the grain rush of 1913.

Collingwood.—The annual meeting of the Farrar Transportation Co. will be held at Collingwood, Ont., on Tuesday, January 28th, when the annual financial statement will be placed before the shareholders. The season of 1911 has been the best in the history of the company, and as a result the shareholders will receive a dividend of ten per cent. with a bonus of five per cent. and yet leave a large sum standing. The net profits for 1912 show an increase of 112 per cent. over 1911, and of 147 per cent. over 1910, and the assets exceed the liabilities by \$140,067. The gross earnings amounted to \$173,181 and the net earnings to \$82,598. Deducting from this the general expenses, the net profit for the year amounts to \$73,338. The company's assets are valued at \$489,013, and the liabilities, including stock held by the shareholders, amount to \$348,945.

Collingwood.—The new steamer North American, of Chicago, Duluth & Georgian Bay Transit Co., which will sail

into Collingwood next summer, was launched at Detroit on Thursday, January 16, at the Ecorse yards of the Great Lakes Engineering Works.

Nanaimo.—When leaving here on Thursday, January 16, with a cargo of powder, the steamer Oscar took fire, and, getting beyond control, was beached on Protection Island. The powder exploded, destruction resulting in Nanaimo of several thousand dollars worth of property. Every plate glass window facing the water front was broken, and a number of persons were seriously cut. The crew escaped before the explosion.

Midland.—The by-law granting a bonus to the Midland Dry Dock Co., carried at the election on January 6, by an overwhelming majority, there being only 46 votes against it. The Dry Dock Co. will commence work at once on the construction of a floating dock to cost about a quarter of a million, and capable of lifting the largest steamers on the Great Lakes. The company consists of Midland men, and is capitalized at \$250,000. The purpose is to acquire suitable property and construct a dry dock, the first unit of which will be capable of handling vessels of the class of the Waubic, and this, it is estimated, will cost in the neighborhood of \$150,000, which sum the company agrees to spend, exclusive of lands. It will be built next season, and is to be followed by a second unit, which will increase the capacity of the dock to take in vessels of the class of the Midland Prince. Such other extensions will be made as the requirements of the trade may warrant. In connection with the above outlay, and in consideration of an agreement whereby the company is to employ at least 60 men for 300 days of the year, the town has agreed to give a bonus of \$25,000 to assist in the purchase of lands that may be required.

Sault Ste. Marie.—Work will be begun on or before April 1 on the erection of a dry dock and shipbuilding plant in this city to cost \$1,500,000. The plant will be completed in one year. The contract will be awarded, it is said, to London, Eng., contractors.

West Fort William.—The Consolidated Elevator Co. is reported to have pur-

MARINE ENGINEERING OF CANADA

chased from the C.P.R. 400 ft. of water frontage immediately east of the present site of the Consolidated elevator on the Kaministiquia river at West Fort William, Ont., on which it will construct a terminal elevator with a store capacity of 2,000,000 bushels.

Vancouver.—The West Vancouver Ferry Co. is inviting tenders for the building of two twin screw steamboats, each having the following dimensions:—Length, 95 feet; breadth, 18 feet; depth, 9 feet: to be fitted with triple expansion, surface condensing engines, and water tube boilers. T. F. Merriek is Secretary.

Empress of Midland.—Shipbuilders along the lakes are being asked for prices for lengthening the Inland Lines steamboat Empress of Midland, by 72 feet.

St. Lawrence Pilotage.—Following on the representations made to the Government by A. Allan, President, and T. Robb, Manager and Secretary, Shipping Federation of Canada, notice of a resolution was given in the House of Commons, Dec. 18, calling for the appointment of a special committee to investigate and report on the whole system of pilotage on the St. Lawrence route and the Great Lakes.

Prince Rupert.—The British Columbia Fisheries Co.'s steam trawlers, Canada and Triumph, arrived at Prince Rupert, B.C., Nov. 23, from Grimsby, Eng., a trip of 16,000 miles.

C.P.R. Officers Pay.—It is announced that the C.P.R. has increased the pay of its officers on cargo boats, the new rates being, chief officer, \$80 a month, rising to \$85 after the first year; second officer, \$60, rising to \$65 after the first year; third officer \$55, rising to \$60 after the first year, being an average increase of \$10 a month.

Washington, D.C.—Col. Goethals, chief engineer of the Panama Canal, told a sub-committee of the House that the canal will have been fully fortified before it is opened.

Hamilton.—The Harbor Commissioners hope to induce the Government to spend \$500,000 on Hamilton Harbor this year.

Halifax, N.S.—The Uranium, which grounded off Chebucto Head recently, was floated on January 17, and came into the harbor here under her own steam.

Toronto.—The steamer Frontier, which was last season operated by the People's Line between Toronto and Lewiston, is to be sold by public auction on Saturday, January 25th, to satisfy the claims of Captain James Quinn and others. The sale has been ordered by Mr. R. S. Stonehouse, marshal of the

Toronto Admiralty district. The boat is tied up at the Polson Iron Works shipyard, and the sale will take place there.

Montreal.—Owing to the unusual mildness of the season, navigation is expected to open much earlier this year than last. Already the Marine and Fisheries Department is pushing work ahead at Sorel, and the Shamrock and other craft belonging to the Department are being overhauled, so as to be in readiness for the annual spring task of laying the buoys in the ship channels as soon as opportunity offers.

Georgian Bay Canal.—The Canadian Parliament will probably appropriate \$3,000,000 for Georgian Bay Canal construction. This first appropriation will be sufficient to permit of the preparation of contract plans and the beginning of preliminary construction work.

Charlottetown, P.E.I.—On Friday, January 3, the firemen on the Dominion Government steamer Earl Grey struck, and the steamer, packed to the hatches with cargo, including a large quantity of perishable products, was tied up all day. The strikers demanded three four hour watches instead of two of six hours. Mr. D. Nicholson, M.P. (Conservative) for Queen's County, took the responsibility of putting on additional men to allow increasing the number of watches, declaring he would fight it out with the Government later.

Sarnia.—A. J. Bonah, captain of the tug Fisher of the Reid Wrecking Co., was fined \$100 by Magistrate Leggatt in the Police Court at Windsor on Friday, January 3, for disobeying the orders of Harbormaster Goodechild. The tug was towing a barge near the Livingstone Channel. The Harbormaster ordered Captain Bonah to slow down, but instead he gave full steam ahead. An appeal will be made.

Charlottetown, P.E.I.—The Government is about to award to a British firm the contract for the Prince Edward Island car ferry, for which tenders were called some months ago. It is understood the figure slightly exceeds half a million dollars.

North Vancouver.—The ferry board was surprised recently to learn from their solicitor, R. L. Reid, that in order to make an extension to the present wharf on Lonsdale avenue to occupy the 100 feet of extra foreshore now being applied for, a special Dominion Act will be necessary.

Vancouver.—That early action will be taken by the Government towards the dredging of False Creek is indicated by the fact that tenders are being called for doing what will be the largest dredging contract ever planned for British Columbia. The Department of Public

Works is calling for the tenders, which are to be received up to the end of January.

Vancouver.—Another liner of the same type as the Niagara is to be built for the Union Steamship Company of New Zealand, according to an announcement made by Sir James Mills, the company's managing director. The vessel will be of 14,500 tons, and it is considered likely that she will be put on the run between the Antipodes and San Francisco during the Panama-Pacific Exposition.

Sydney.—The Dominion Coal Company have purchased two more steamers to add to their fleet. They are the Corunna and the Nevada, which are at present lying in the harbor of Sydney. Each has a carrying capacity of about 1,400 tons.

Owen Sound.—The report has been current here for some time that the Dominion Transportation Co. will put an extra boat on their north shore line next season, and that all the boats will call at Port McNicoll.

Port McNicoll.—The Orillia Packet says:—Provision is made for the construction of another unit to the big C. P. R. elevator at Port McNicoll, and the work will be gone on with in the spring. With the extension this will be the largest elevator on the Great Lakes, and the company's storage capacity will be of immense proportions. This year it is intended to use a number of vessels for storage at that point, which will result in sufficient grain being on hand to keep that part of the freight department busy all winter.

Collingwood.—The Collingwood Shipbuilding Co. are constructing the largest bulk freighter ever built in the British Empire to the order of the Chicago and St. Lawrence Navigation Co., and at the same time are engaged on two steel dredges for the Dominion Department of Public Works. Around the company's piers are lying a number of steel freighters, nearly all of which will require repair work before going into commission next spring.

Fort William.—The Calgarian, sister ship of the Hamiltonian and the second vessel to be constructed at the Western Dry Dock and Shipbuilding yards, was launched recently, being christened by Mrs. L. H. Wallace, wife of the manager of the works. The function was performed without any great ceremony, and the only difference at the works was the number of people who were present. The Calgarian is the property of the Canadian Inter-Lake Line, in whose service she will ply between the Twin Cities and other eastern Canadian ports.

Vancouver.—Damaged through the recent storm, stays in the English Bay

Pier have given way to such an extent as to make it risky for any great crowd to assemble on it. Many 16-inch timbers were broken by the force of the wind and waves. The park commissioners have had an engineer make a thorough examination of the structure, and steps will be taken to have it properly strengthened.

Lunenburg, N.S.—The crew of the British schooner *Aldine*, numbering probably six men, are believed to have perished in a gale on Christmas Eve off the Maine Coast, near St. Pierre. At day-break the wreck of the vessel was found on the north side of St. Pierre roads. The *Aldine* was a three-masted vessel of 112 tons, owned by A. V. Conroy of Lunenburg, N.S.

The Orient Steam Navigation Co. is considering the formation of a subsidiary company to act as its insurance company. A separate company, known as the Orient Underwriting Fund, Ltd., with a capital of \$100,000, will be established.

Oil for British Navy.—It is reported in well-informed circles that the British Government has placed contracts for sixty-one million gallons of oil for use in the navy. No less than twenty-nine oil steamers are being built. One company that had a commission for oil tank steamers had to refuse another for nine, owing to inability to undertake the work. It is expected that the order will go to American shipbuilding concerns.

Midland.—John McDonald, an employee of the Canadian Dredge Company, was instantly killed by the snapping of a cable attached from the tug D. S. Pratt to the freighter *Midland King*, which was being moored into winter quarters on Monday, December 23.

Windsor.—Navigation on the Detroit River for the season of 1913 was opened on January 1, by the sand steamer *John M. McKerchey*, which brought down a cargo of sand from points along the St. Clair River.

Kingston.—When the steamer *Wolfe Islander* was on her way over from Wolfe Island with farmers for market on Saturday, December 28, fire started from an unknown source in the wheelhouse, and there was almost a panic. The men on the boat acted promptly, however, and with the use of a hose soon had the fire out. The steamer was half-way across the harbor when the fire was discovered.

Sarnia.—The steamer *Hamonic* of the Northern Navigation fleet has been put into the Reid Wrecking Company's dry-dock at Port Huron so that repairs can be made to underwater parts. Repairs will be made to the barge *Hustler* so that she will be ready for the opening of

navigation in the early spring. The work will cost when completed several thousands of dollars.

Owen Sound.—It is stated on good authority that the financing of the million and a half dry dock proposition has been completed. Next spring may see the breaking of the sod. With the iron working industries already secured, or about to come, the dry dock would certainly round out the town's manufacturing activities.

Port Arthur.—Arrangements have been made by which American vessels presenting themselves at Port Arthur and Fort William after December 5th, midnight, when ordinary insurance expired, will be permitted to load up with grain, remain at these ports, and on their first trip in the Spring, deliver their cargoes at Point Edward, Goderich or Georgian Bay ports.

Port Huron.—The N. N. Co.'s steamer *Hamonic* is undergoing some bottom repairs in Reid's dry dock here.

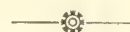
Sarnia.—If the plans of several Sarnia and Port Huron capitalists carry, a new boat line will be operated next summer out of this port to the town of Bayfield, in Huron county, Ontario, on the shore of Lake Huron. The line will operate as passenger and freight, and will touch at all the little lake points where there is no rail connection. Besides several local men, Messrs. Everett of Cleveland are also interested. It is reported from Ottawa that the harbor at Bayfield is to be dredged and a dock built.

Sarnia.—The Reid Wrecking Company have undertaken to turn over the sand barge *Hustler*, which sank recently near Algonac, and was brought to this port later in a capsized condition. The wrecker *Manistique* and two powerful tugs made several efforts to roll her over, but were prevented by the smashing of steel cables and ropes.

St. John's.—Captain Burke and the eight members of the crew of the fishing schooner *Evelyn* were hauled to safety up the steep cliffs at Isle Au Bois cove by the fisher folk at that hamlet on Friday, January 10, after the *Evelyn* had been dashed to pieces on the ledges off the shore. Hope of reaching shore safely was slight until a boat, manned by three Au Bois fishermen, put out from shore and reached the *Evelyn's* side. When the transfer of the schooner's crew from their wrecked vessel to the small boat had been accomplished, and the boat headed for shore, the wind shifted, and the small craft was carried out of its course, and was thrown on a narrow shelf of rock at the foot of the cliffs a mile down the coast, whence they were pulled to safety by means of ropes.

Montreal.—W. G. Ross, Chairman of the Harbor Commissioners, stated in the course of a speech delivered on board the tug *Sir Hugh Allan* on Friday, Jan. 3, during a trip down the river to which the Commissioners had invited a number of newspapermen and others, that the navigation season this year would witness the advent of a new line of steamers to Montreal, though as yet he was not free to say what that line was. Opinion is general that *La Compagnie Generale Transatlantique* is the line to which Mr. Ross referred.

Vancouver.—The fishery protection cruiser, *Newington*, Captain Barnes, which has been patrolling off the coast of Vancouver Island and adjacent waters, has resumed her duties. She went to Victoria recently to refit. The *Quadra*, Captain MacPherson, is also under orders to sail and will take material to the new lighthouse at Langara, from Prince Rupert. She will also take supplies to Triangle Island for the lighthouse and wireless station there.

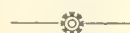


FATAL STEAMER CASUALTIES.

THE mortality from the wreck or damage of steamers belonging to the United Kingdom in the ten years ending with 1910 inclusive, was as annexed:—

Year	Crew	Passengers	Total
1901	327	8	385
1902	460	674	1134
1903	364	22	386
1904	305	9	314
1905	328	111	439
1906	180	5	185
1907	452	89	541
1908	282	88	370
1909	396	117	513
1910	526	141	667

The annual returns show violent fluctuations; this is due to the effect exerted upon the total for any one year by some special catastrophe. Account should be taken of the gradual increase in the number of steamers in operation.



TO LIVERPOOL VIA RED RIVER.

NAVIGATION by the Red River, Lake Winnipeg and the Nelson River to Hudson's Bay is contemplated in steps that are being taken toward making the Red River of the north a permanent navigable highway. The new route when completed would be 1,200 miles shorter to Liverpool than the present route, and will give an outlet for the grain to the world's market by water with but two handlings en route.

MARINE ENGINEERING OF CANADA

ATLANTIC CURRENTS AND ICE-BERGS.

DR. MYERS COPLANS, Demonstrator of Bacteriology and Public Health in the University of Leeds, recently returned from his voyage in the North Atlantic, says the Yorkshire Post, which was undertaken for the purpose of studying the currents and composition of the water. In view of the Titanic disaster, the investigations which are now proceeding promise to be of the utmost value to the shipping world, as well as of great interest from a purely scientific point of view.

In May last, in "Nature," Dr. Coplans had a note on "A Method of Detecting Icebergs in Water," and it is the method there indicated which he has put to a severe test in the stormy Atlantic. In order that the nature of the work may be better understood, it is necessary to recall one or two well-known facts concerning sea water and icebergs. Icebergs are formed from

affords hopes of greater success than mere temperature, because it has been proved that in the immediate neighborhood of an iceberg the temperature may be as high, or even higher, than that of the normal ocean water. Particularly is this the case in the dangerous part of the ocean south of Newfoundland, where the influence of the Gulf Stream vitiates the significance of thermometer readings from this point of view. The difficulty with electrical apparatus has been its sensitiveness to variations of temperature, but in the apparatus which Dr. Coplans has devised, there is an automatic correction for varying temperatures; it is, in fact, a compensating salinometer. During the whole time that the ship is at sea, the salinometer is working, and, fitted with a recorder, it will give a continuous record of the salinity of the water through which the ship has passed. Its warning is instantaneous, because in the ice zone any marked diminution in salinity would

that there is a considerable variation even in this relatively small difference in depth. This is due to the newly liberated fresh water (being of a lesser density than salt water) floating on the surface. A great river discharging into the deep ocean mixes its contribution pretty thoroughly with the ocean water.

Scope of Test Performed.

The tests which Doctor Coplans has just completed were made on board the Royal Mail Liner Royal Edward. This vessel took the "short cut" across the Atlantic, along the track which at certain seasons of the year is regarded as dangerous on account of ice. On the journey no fewer than 34 icebergs were sighted. A continuous record was made of the salinity of the ocean from Avonmouth to Rimouski, through the Strait of Belleisle, and on to Montreal. The record was subsequently continued from Montreal up the St. Lawrence, through Lake Ontario to Niagara. Owing to



OIL ENGINE PROPELLED SHIP "CALGARY," BUILT BY SWAN, HUNTER & WIGHAM RICHARDSON, LTD., WALLSEND-ON-TYNE, FOR THE CANADIAN LAKES SERVICE. She is 256 ft. over all, 42 ft. 6 in. beam, 19 ft. moulded depth, and is designed to carry 110,000 bushels of grain on a load draft of 14 ft. The auxiliary machinery is steam operated, steam being generated in a boiler burning oil fuel.

fresh water, and as they float about in the salt water of the ocean they are continuously melting. The fresh water dilutes the sea water, and in the neighborhood of the berg the result is that the sea is less saline than the normal. These variations may be indicated by specific gravity, but the test could not be made sufficiently delicate at sea. Chemical analysis is also out of the question for the mariner. Moreover, both of these tests must be intermittent, and more or less casual. At the Titanic inquiry it was suggested that temperature might afford reliable information with regard to the proximity of a large mass of ice, but Dr. Coplans' observations go to show that temperature alone is a very unreliable guide.

Recording Salinometer.

Electricity, therefore, has been brought in as a method of testing. It has been found from experiment that, whereas the conductivity of water derived from an iceberg may be expressed at 90, the conductivity of sea water is 50,000. This wide range of variations

cause the navigator to suspect the proximity of ice.

Influences Affecting Salinity.

It will be obvious that other causes besides melting ice may lead to a diminution of salinity—such, for example, as the effluent from a great river, or the persistence of a strongly marked fresh-water current such as those from the Arctic regions. Already Dr. Coplans has discovered that both the St. Lawrence and the Severn have an influence on the salinity of the sea at far greater distances than has hitherto been supposed. The new apparatus has, therefore, to be read in the light of geographical position. It may, however, be possible to differentiate between estuary dilution and dilution due to an iceberg by fitting two sets of apparatus. If we take the depth of a modern liner at 30 or 35 feet, one apparatus fitted just below the water line and another at the lowest possible point in the ship would show no difference in salinity under normal conditions. In the neighborhood of an iceberg, however, it has been found

dense fog prevailing in the Strait of Belleisle during the return journey, the ship's course was altered for Cape Race and the south coast of Newfoundland, so affording an opportunity for the effect of the River St. Lawrence to be traced to its ocean limits. The apparatus was installed in the hold of the ship, 20 feet below the surface, and as it was not fitted with a recorder it needed continual watching. The records were taken in duplicate — one set by the ship's officers and the other by Doctor Coplans, with the assistance of the chief engineer, Mr. W. Boddey. Complete meteorological records were also taken, and Lieut. C. de V. Le Sueur, R.N.R., acted as cartographer.

Test Phenomena.

All the data thus obtained have yet to be analyzed and correlated, but some very interesting phenomena were revealed by the instrument. The first thing that struck the observers was the very long distance out to seas—much farther than had hitherto been supposed to be the case—at which the influence of the

River Severn on the salinity of the ocean could be traced. Confirmatory evidence of this permeation of river water through the ocean for long distances was afforded on the other side by the St. Lawrence. Dr. Coplans had previously suspected that icebergs followed definite tracks; indeed this idea is suggested by the charts issued by the British Government, showing, amongst other things, the position of observed icebergs. Some of these tracks were discovered on the voyages out and home, being indicated by a great variation in salinity. The investigators also found a very strongly marked Arctic current, consisting of water of greatly diminished salinity and of a very low temperature. As between this current and the normal ocean, there was a diminution of 25 per cent. in salinity. On the eastward side of this current, for about 500 or 600 yards, the temperature of the water was just about freezing point. The currents have seasoned changes in direction, but otherwise are constant.

These two experimental trips across the Atlantic have opened up a wide field for further investigation, and in view of the great interests concerned in the navigation of the North Atlantic, there is no doubt that the matter will be still further pursued.



BOLINDER MARINE OIL ENGINE.

THERE are few marine engineers working on vessels using oil as a motive power, who have not been bothered with the reversing arrangements hitherto placed on the market by firms manufacturing marine oil engines. They will, therefore, be interested in a crude oil engine, recently introduced into Canada by the Canadian Boving Co., Ltd., of Toronto, an engine which re-

verses more easily than a steam engine. This is the Bolinder semi-Diesel engine, made in types for both land and marine, one each of which has been installed near the Canadian Boving Co.'s office, Toronto, for exhibition purposes. These were recently seen under test by a member of the staff of Marine Engineering of Canada, on which occasion they gave proof of everything claimed for them by their manufacturers.

Cycle of Operations.

The engine works on what is known as the 2 cycle principle, that is to say, there is one impulse each revolution. The working cycle is as follows:—

When the piston (A) at the end of its outward stroke is moving in towards the ignition chamber (E), the necessary air for combustion is drawn through the air valves (B) into the enclosed crank housing, and at the same time the air in the cylinder (D) is being compressed.

When the piston (A) has reached its extreme inward position, a certain amount of crude oil is injected into the ignition chamber (E) through the nozzle (F), and the fuel charge explodes the expanding gas, driving the piston outward towards the shaft. During the outward stroke of the piston, the air in the crank housing is compressed. As the piston nears the end of its stroke, the exhaust port (G) opens, and immediately after, the inlet air port (H).

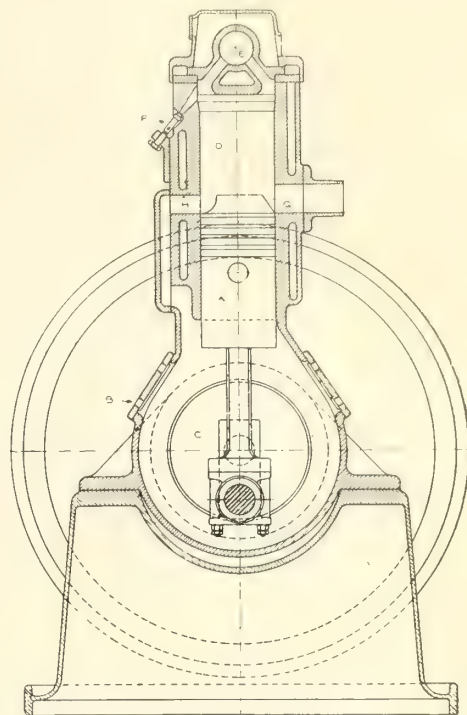
The burnt gases escape by the exhaust port (G), while the compressed air in the crank housing entering the cylinder by the port (H), completes the scavenging work and furnishes the cylinder with air necessary to make up the next fuel charge. It will be noticed that the ignition chamber (E) has two ports; by this means it is blown through with fresh air every revolution, an important feature for securing a rapid and effective ignition. The piston is now on the inward stroke again and the cycle is completed.

Simplicity and cheapness of operation are two good points in the Bolinder crude oil marine engine that cannot be overlooked. The 12 h.p. engine on exhibition in Toronto consumes 1.02 gals. of crude oil per hour, at a cost of eight cents a gallon. An engine of the same size using gasolene would consume 1.5 gals. an hour, which, taking the cost of gasolene as 24 cents a gallon, runs the operating cost up to 32 cents an hour.

Simple Speed Regulation.

The engine is easily regulated, and this feature is highly important in the case of marine engines. From full speed to the merest rotation movement is accomplished by the simple regulation of a spring governing the fuel supply. This fact, coupled with the effi-

cient direct reversing system, has brought this prime mover a large degree of popularity. The reversing



SECTION OF BOLINDER OIL ENGINE.

feature has created the greatest interest among shipping men because of its simplicity and reliability; a small lever only being used for changing the direction of rotation.

Forced lubrication for both cylinder and bearings has been adopted for this engine, the device being a Bolinder patent. The supply of oil can be adjusted to suit requirements.



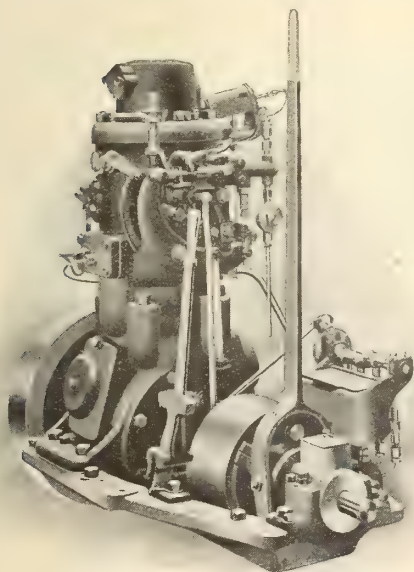
COMMON SENSE FLUE CLEANER.

THE Garlock Packing Co., Ltd., of Hamilton, Ont., are handling a flue cleaner, which carries the name of "Common Sense." It was given this name because it never gets stuck in a flue, and will pass all welds or collapses. The common sense is in the design. The makers claim that the ordinary flue-cleaner fails to get the flue clean be-



"COMMON SENSE" FLUE CLEANER.

cause it only rubs the baked carbon, which cannot be rubbed off; also, that some run so hard, because the rub is almost square across the flue. This flue cleaner is adjustable to wear, the latter coming on the cutters or knives without injury to the frame. By passing a file over the knives the latter can be sharpened.



BOLINDER MARINE OIL ENGINE.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Mr. Robert Curr, naval architect, has been appointed a Lloyds surveyor at Port Arthur, Ont.

* * *

Capt. James Gaudin, wreck commissioner for British Columbia, died on Monday, January 13.

* * *

Capt. F. Davis, of the steamer Scottish Hero, has been appointed to the captaincy of the Mars, the largest boat of the Canada Interlake Steamship Co.

* * *

Capt. Bertham has been appointed to the command of the C.P.R. steamship Empress of Russia, and will be succeeded on the Empress of India by **Capt. Harley**, heretofore chief officer.

* * *

Capt. Thomas Gaskin, formerly of Kingston, died in Buffalo on Sunday, January 12. He has been sailing United States steamers for several years. The remains were taken to Kingston for burial.

* * *

Lieutenant-Colonel William Patrick Anderson, chief engineer, Department of Marine and Fisheries, Ottawa, received the decoration of Commander of the Order of St. Michael and St. George in the distribution of New Year honors by King George V.

* * *

Capt. Tait, Vancouver, has been appointed master, and **W. H. Partington**, formerly of the Princess Charlotte, chief officer of the steamship Kestrel, recently sold by the Dominion Government. The Kestrel left Victoria recently for Fanning Island, for trading among the Pacific Islands.

* * *

Shipping Honored.—Among those honored by the King with knighthoods on the first of the year were three men well known in the shipping world. They

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balacavia Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.

President—James Playfair, Midland; **Counsel**—F. King, Kingston, Ont.

GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

Chairman—W. F. Wasley, Gravenhurst, Ont. **Secretary**—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.

President—A. A. Heard, Albany, N.Y. **Secretary**—M. R. Nelson, New York. . . .

THE SHIPPING FEDERATION OF CANADA

President—A. A. Allan, Montreal; **Manager and Secretary**—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; **Grand Secretary-Treasurer**—Capt. H. O. Jackson, 376 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

James T. McKee, 268 Douglas Avenue, St. John, N.B., **Grand President**. **Thos. Theriault**, Levis, P.Q., **Grand Vice-President**.

Neil J. Morrison, P.O. Box 238, St. John, N.B., **Grand Secretary-Treasurer**. **Jno. A. Murphy**, Midland, Ont., **Grand Conductor**.

George Bourret, Sorel, P.Q., **Grand Door-keeper**.

Richard McLaren, Owen Sound, Ont. **L. B. Cronk**, Windsor, Ont.

Grand Auditors.

are: **Mr. Thomas Benjamin Bowring**, senior, London, director of Messrs. C. T. Bowring & Co., Ltd., shipowners and merchants; **Mr. Arthur Holland**, head of the firm of Messrs. Arthur Holland & Co., shipowners; and **Mr. Richard Mathias**, member of the firm of Messrs. J. Mathias & Sons, shipowners, Cardiff.



TUG LAUNCHED AT POLSON'S.

THE Fredericton, a new steel tug for service in salt water, was successfully launched at the beginning of the year from the Polson Iron Works, Toronto, under the auspices of T. H. Schwitzer, mechanical superintendent of the Department of Public Works at Ottawa. The new vessel is 80 feet long, 20 feet beam, and 10 feet deep, and will be stationed in the lower St. Lawrence.

Her machinery consists of a compound surface condensing engine, having cylinders of 12 and 26 inches diameter by 18 inches stroke. The boiler is of the Scotch type, 10 feet diameter by 11 feet long, with a working pressure of 150 lbs. There is also an electric light and search-light installation forming part of the equipment. She will be used in connection with dredging work on the New Brunswick coast.



CORRUGATED SHIPS.

NAVAL-CONSTRUCTOR David W. Taylor, U.S.N., will conduct a series of tests on models of ships with corrugated sides at the Washington navy yard during this winter. Four merchant ships of this type, built in England, have proved successful. It is hoped that the same idea may be applied to battleships with a marked saving in propulsive power. Two outward curves, 23 inches deep, run the length of the ship between the load water line and the bilge. Between the convex curves is a concave surface of equal depth.

Directory of Subordinate Councils for 1913.

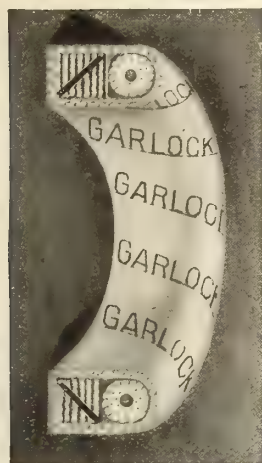
Name.	No.	President.	Address.	Secretary.	Address.
Toronto,	1	A. J. Fisher,	490 Concord Ave.	E. A. Prince,	61 Elm Grove, Toronto.
St. John,	2	J. F. Matthews,	50 Douglas Ave.,	G. T. G. Blewett,	65 Harrison St., St. John, N.B.
Collingwood,	3	Andrew Kerr,	Box 343, Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood.
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3208 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	A. S. DeGruchy,	Room 23, Williams Bldg.,	859 Thurlow St.	
Levis,	8	Helaire Mercier,	Blenville, Levis,	E. Read,	Blenville, Levis, P.Q.
Sorel,	9	Geo. Bourret,	Sorel, P.Q.,	Jules Lecours,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	H. W. Fletcher,	636 4th Ave. East,	Al. Charbonneau,	1030 1st Ave., Owen Sound, Ont.
Windsor,	11	Alex. McDonald,	Windsor, Ont.,	E. J. Riley,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,	Midland,	Neil Maitland,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Jno. A. Murphy,	Portland Street, Dartmouth, N.S.
Sault Ste. Marie,	14	Thos. O'Reilly,	Sault Ste Marie,	Chas. E. Pearce,	Sault Ste Marie, Ont.
Charlottetown,	15	J. K. Sutherland,	Charlottetown, P.E.I.,	Geo. S. Biggar,	302 Fitzroy St., Charlottetown, P.E.I.
				Lem Winchester,	

Garlock Marine Packings

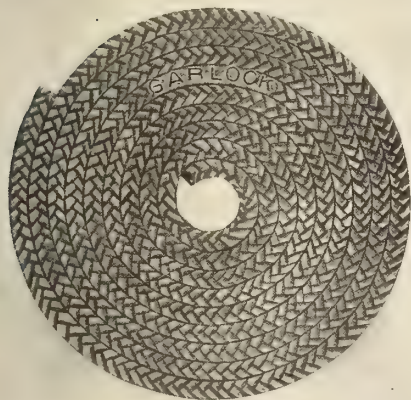
For years have stood the severest tests
under many and various conditions



Garlock High Pressure Ring



Garlock High Pressure Diagonal



Garlock Square Flax

Our handsome 1913
catalog, fully illustrat-
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showing Packings for
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The Garlock Packing Co.

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BRANCHES:

Montreal Toronto

Winnipeg

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Garlock High Pressure Spiral



Garlock Low Pressure Diagonal

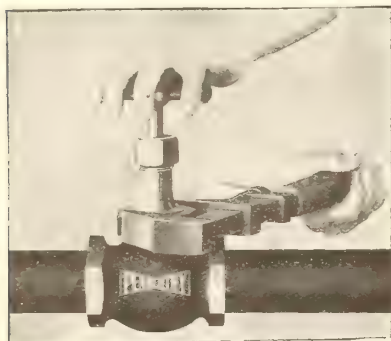


Garlock Gum Gore

The advertiser would like to know where you saw his advertisement—tell him.

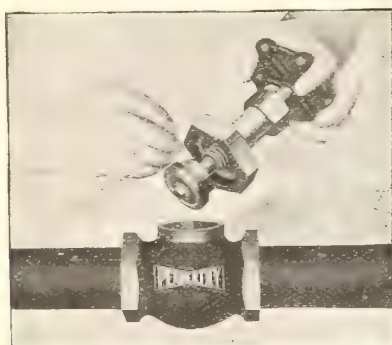
Regrinding Valves

THE ever-increasing demand to-day by marine engineers and shipowners in general is for valves that will give absolute reliable service and de-



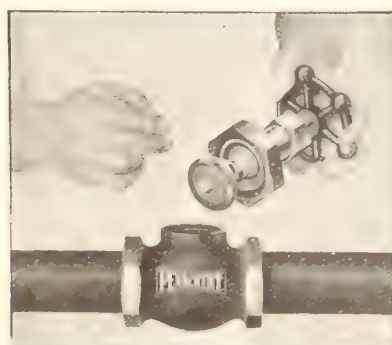
Removing Union Ring

pendability under high pressures and severe conditions, and that are free from unnecessary renewal of discs and repair parts. To meet this demand, the Penberthy regrinding valve has been designed. It is the result of many years of practical experience in the manufac-



Inserting Pin

ture of high-grade brass goods, and embodies the latest mechanical constructional ideas. It is claimed to be the heaviest regrinding valve manufactured, and the distribution of metal is such that parts subjected to the greatest strain and wear have proportionately



Applying Oil and Emery

heavier walls. For the present there is only illustrated the medium pattern

type, which is guaranteed to stand a constant working pressure of 200 pounds.

Constructional Detail.

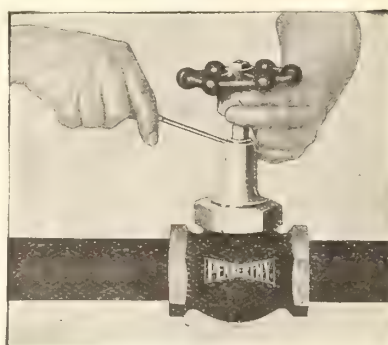
A sectional view of the regrinding valve is illustrated herewith, which will give the reader an intelligent idea of the design, construction and general features. It will be noticed that the restrictive areas are largely in excess of the area of the pipe. The long sweep of the body permits easy flow of steam or liquids, thereby reducing friction to a minimum and giving long life to the body. The pipe threads are long and have the full standard depth, while the hexagon ends of the body have large and



Regrinding

heavy faces. This heavy construction with the increased thickness of metal in the wall near the hexagon insures against the severest of strains.

The union hub ring is extra heavy, and secures hub to body, making a steam-tight and rigid connection. The threads on the hub end of the body being on the outside make the above connection absolutely non-corrosive and permit free accessibility to the valve at

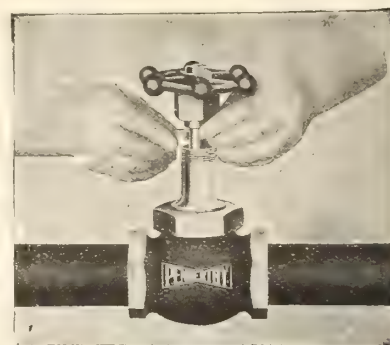


Removing Packing Gland

any time without strain or injury to same. The method used in securing the stem to the disc is novel, for in order to remove the disc from the stem it is only necessary to place the small square on the bottom of the disc in a vise or wrench and unscrew same by means of a wrench.

Attention is called to the threaded part of the stem, which also is a feature of the Penberthy regrinding valve. All

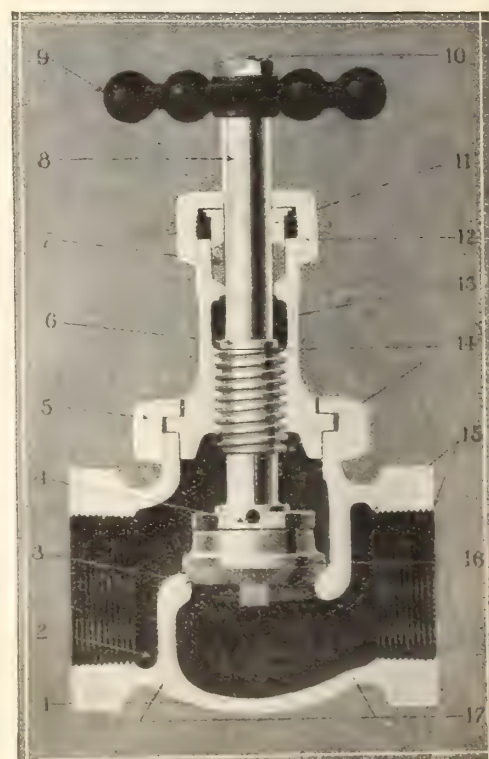
threads are of full depth, clean-cut and true to standard. They are so designed that every thread is utilized when opening and closing valves, thereby overcoming all dangers from "stripping" threads.



Repacking

Method of Regrinding.

The method of regrinding, as illustrated herewith, is a simple operation, and can be accomplished by first removing the union ring or nut which fastens the trimmings to the body of the valve. This is easily done, as the threads which hold the ring to the body are outside of the latter, and are immune from corrosive action of scale or lime. When this is done, insert pin through the slot in the disc lock nut and hole in the stem, which firmly secures the disc to the stem. By applying a little oil and fine emery, or if this is not available, a little soap and fine sand to this disc, and returning the trimmings to the body, the valve is ready for regrinding. To regrind, allow the bottom of the hub



5 1/4 INCH SECTIONAL VALVE.

to work in the neck of the valve body, slightly elevated from the top, so as to cause the disc and seat to come in contact with each other, and by rotating the trimmings back and forth the re-grinding operation is accomplished. Care should be taken that all abrasive or foreign materials are removed from seat and disc before and after regrinding, also that small inserting pin is removed before putting trimmings back in place. When reground, the valve is as good as new, at practically no additional cost.

NEW AUSTRO-CANADIAN LINE.

The C. P. R., it is rumored, will shortly inaugurate an Austro-Canadian steamship service having a direct line

from Trieste to Canada. Montreal will probably be the landing port in summer and St. John in winter. Mr. G. M. Bosworth, vice-president of the C. P. R., would not confirm or deny the rumor. "The company," he said, "have not made any definite decision regarding such a service, and as the matter stands now it is only a rumor."



BRITISH WRECKS REPORTED IN NOVEMBER.

THE number and net tonnage of British vessels respecting whose loss reports were received at the Board of Trade during the month of November, 1912, and the number of lives lost are as follows:

	Vessels Number.	Net Tonnage.	Lives Lost.
Sailing	24	935	18
Steam	12	10,556	22
Total...	36	11,491	40

The above table is a record of "reports received" in the month, and not of wrecks which occurred during the month. Many of the reports received in November relate to casualties which occurred in previous months. The figures include the losses of eight sailing vessels of 384 tons belonging to British possessions abroad, involving the loss of the lives of six persons. Casualties not resulting in total loss of vessels and the lives lost by such casualties are not included.

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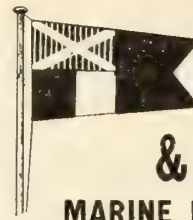
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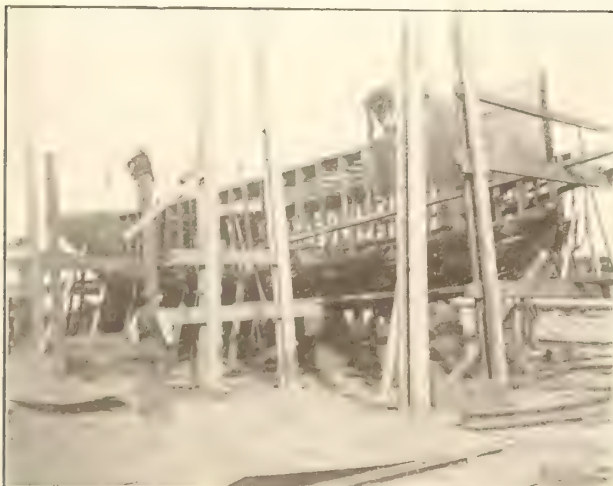
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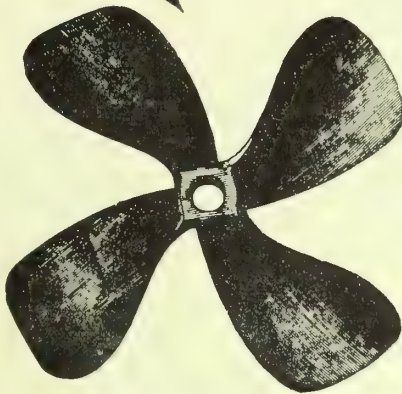
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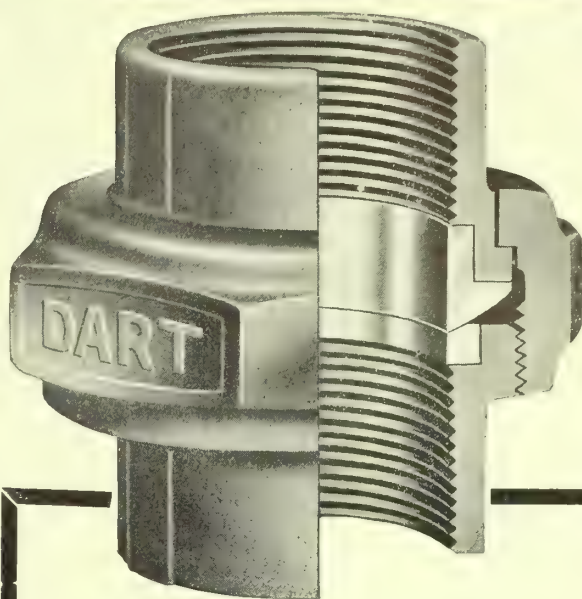


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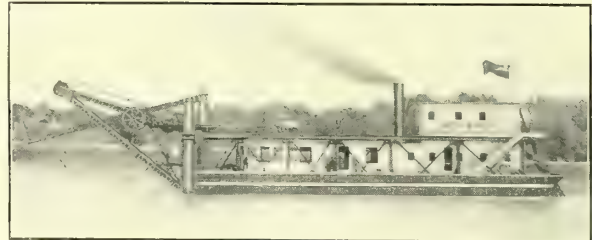
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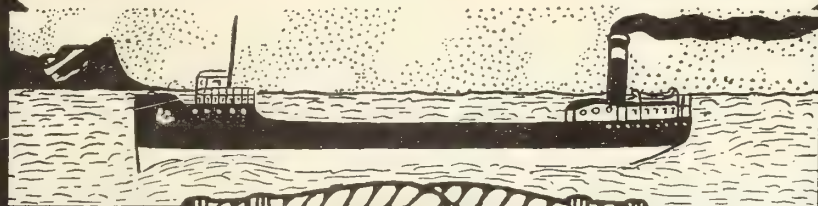
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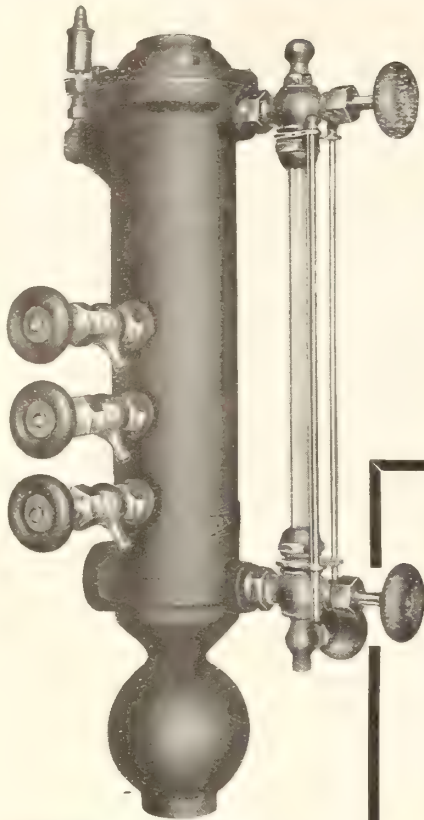
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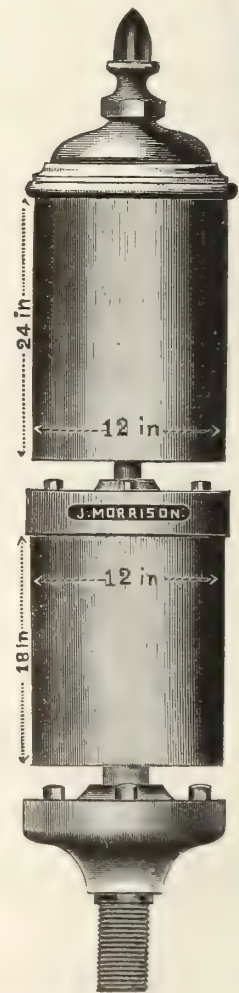
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THE builders of the *Fordonian*, the Clyde Shipbuilding and Engineering Co., Ltd., Port Glasgow, are the first firm on the Clyde to put to sea a vessel propelled by two stroke cycle Diesel oil engines.

Vessel Features.

The leading dimensions of the ship are 250 ft. long, 42 ft. 6 in. beam, 16 ft. 10 in. moulded depth to the main deck, and 26 ft. 6 in. to the awning deck. The *Fordonian* has a 2-ft. frame pitch, and a deadweight cargo-carrying capacity of 3,300 tons on 16 ft. 6 in. draught. The draught on service is restricted to 14 ft., and the dead-weight capacity is thus

any one of the many locks through which she passes in her regular trading. There are two independent controls from the bridge to the engine-room telegraph, and the steam steering-engine is operated by rods from the bridge.

As with sister-ships, there are two masts with derricks on each, and the chart-house and navigating bridge are situated right forward. The rudder is balanced and is of large area. In the trials the vessel turned almost in her own length, and when the helm was put hard over she almost came to a dead stop. The propeller is 11 ft. 9 in. in diameter by 9 ft. pitch.

round the whole of their periphery, and communicate with an exhaust-belt of large cross-sectional area running round the cylinder. The water spaces are large, as the elevation of the cylinders show, and ribs are cast on the inside of the cylinder to aid water circulation and to give to the cylinder-wall strength to resist the direct pull passing through it.

Two Unit Arrangement.

The piston of the Carls engine is in two pieces, the top piece being carried by a shoulder on the piston rod, and the bottom piece or shroud at its bottom, by another shoulder on the piston rod. The forming of the piston in two pieces

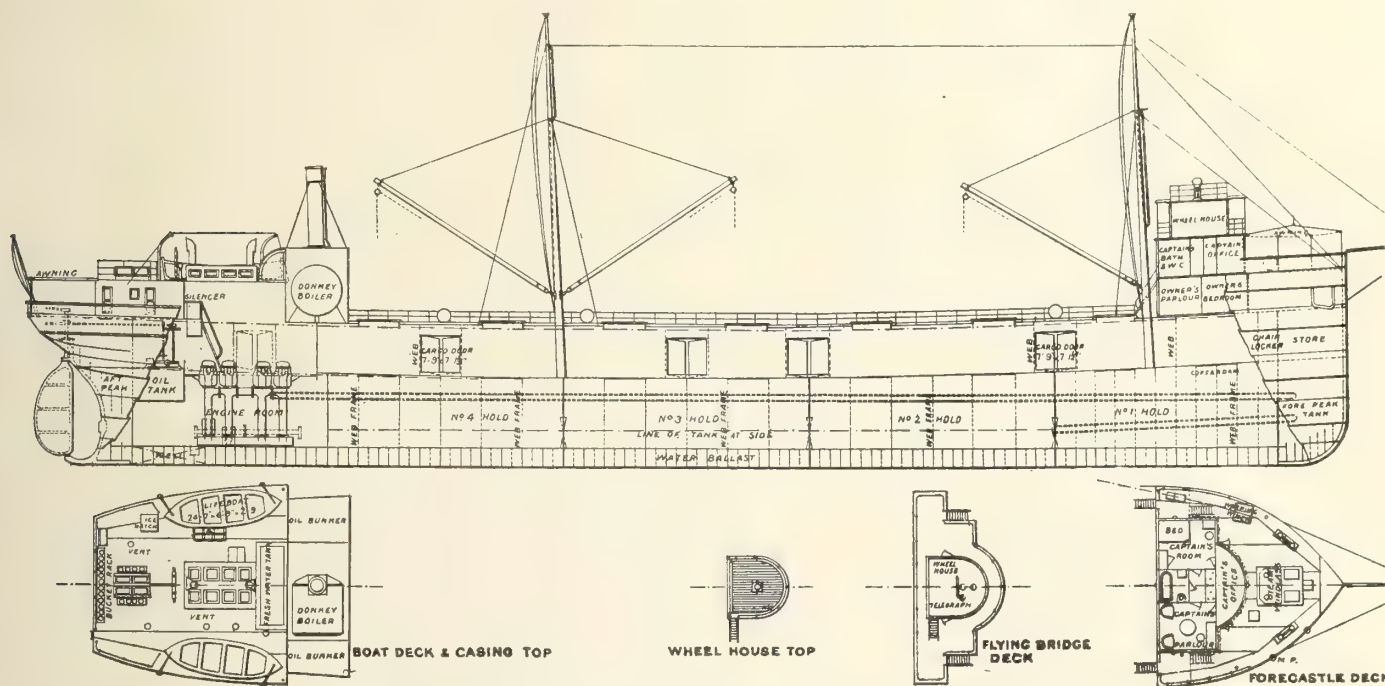


FIG. 1. OIL ENGINED SHIP "FORDONIAN" — CANADIAN INTERLAKE LINE.

reduced to 2,200 tons. She is built to Lloyd's highest class for the Canadian Interlake Line, for grain-carrying on the Great Lakes. The vessel conforms to the standards of Canadian Lake practice in that she has a steering-pole out forward to make quite handy the control from the forward bridge, a large number of hatches, and inward opening cargo-doors on the port and starboard sides to facilitate the rapid removal of cargo. The cofferdam at the forward end of the fore hold is unusual in such vessels, and is intended to preserve the cargo from damage should the ship spring a leak as a result of coming in contact with

Propelling Machinery.

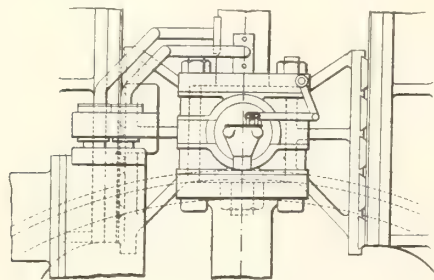
The main propelling engine is a four-cylinder two-stroke cycle single-acting Carls type of Diesel oil engine. The cylinder dimensions are 460 mm. (18.1 in.) diameter by 820 mm. (32.25 in.) stroke, and the engine runs normally at about 100 revolutions per minute. It will be seen that in their main features, steam engine marine practice has been closely followed. The bed-plate is of cast iron and is of the usual marine design, having a flat bottom and being supported in the centre as well as at the sides. The cylinders have separate liners pressed in, and the liners have exhaust ports

makes for simple castings, and when the high temperatures are considered, this is a desirable end. Water cooling is adopted for the piston.

The arrangement of the engine into two units of two cylinders each permits of a two-piece crank-shaft in interchangeable halves, of the vertical spiral drive for the valve gear being taken from the centre of the engine, and also of the scavenging-pumps being driven from the two centre cross-heads by links, as with the air-pump of steam-engines. The dimensions of the double-acting scavenging air-pumps are 27 1/4 in. in diameter with a 23 1/2-in. stroke.

There is a ratio of free air compressed for scavenging to combustion air taken into the main cylinders of 1.65, which is higher than the usual practice. The pressure of the scavenging air is 3 lbs. per sq. in. There are four valves in the cylinder-head for the inlet of the scavenging air to cope with the large volume of low-pressure air used in the engine.

The exhaust is led down by bent cast iron pipes from the cylinder-belt to the main exhaust pipe running along the en-



ENGINE DETAIL, "FORDONIAN."

gine to the cast iron silencer. These bends have internal water injection, and the silencer is also internally water-cooled and is of the cascade design. This very effectively silences the exhaust, but it is difficult to judge the combustion of the engine at the overboard exhaust, since the water must cleanse unburnt products. The exhaust is led overboard under the counter. The funnel is for the exhaust gases from the donkey-boiler. The crank-shaft is built up, since the large stroke-bore ratio permits of this construction, and the connecting-rod is standard marine practice.

Lubrication.

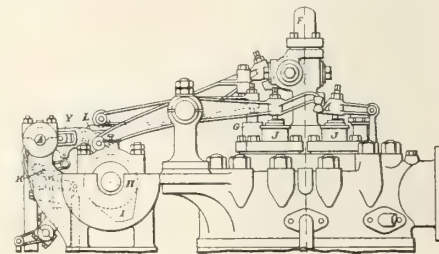
The system of lubrication is interesting. For the main bearings, solidified oil is used, for the crank-pin bearings the ordinary drip-feed suffices, and the bearing pressures for the main and crank-pin bearings are respectively about 300 lbs. and 650 lbs. per sq. in. For the lubrication of the cross-head bearing, a small lubricating-oil forcing-pump is attached to each crosshead, and worked by the swing of each connecting-rod. This system of lubrication permits of an open crank-case, and the bottom end bearings can always be easily felt by the engineer on watch. There are two guides for each, such being Messrs. Carels' practice for oil-engines. The piston is lubricated by four Mollerup lubricators, which force the oil between the piston and the cylinder; there are four inlets to the cylinder, arranged to enter on the fore-and-aft and athwartship centre lines.

Valve Gear and Control.

The feature about the valve-gear is the wedging action whereby the starting air is gradually cut out and the fuel-oil gradually cut in. This gives an even turning moment all the time. At the commencement, the air pressure, 800 lbs. to 1,000 lbs. per sq. in., ensures that there is a large starting torque; further, the design of the starting-valve mechanism necessarily gives that large starting torque at all positions of the cranks, and the wedge action makes for an even turning moment throughout the period of engine acceleration. There is no shock due to the air being suddenly

cut off and the fuel suddenly cut in. It is a gradual process, the one merging into the other.

The control of the engine is by means of one wheel and two levers on the starting platform; one lever X, fig. 2, controls the compressed air engine, which gives the cam-shaft its angular displacement by raising or lowering the vertical driving-shaft, and also gives the manoeuvring-shaft its fore-and-aft movement. The other lever, W, con-



ENGINE DETAIL, "FORDONIAN."

trols the fuel. The wheel V, Fig. 2 which is operated by hand, gives the manoeuvring-shaft its rotary motion. Hand control is also provided by the handle on the column, which actuates a shaft running fore and aft on the engine, and so sets all the fuel-pump suction-valves. The small dial seen above the hand-wheel indicates the position of the valve-gear. Although compressed air is used, as stated, for actuating the vertical shaft, causing the angular rotation of the cam-shaft and the rotation and displacement of the manoeuvring-shaft, emergency hand-gear may be used—viz., wheel T, Fig. 2.

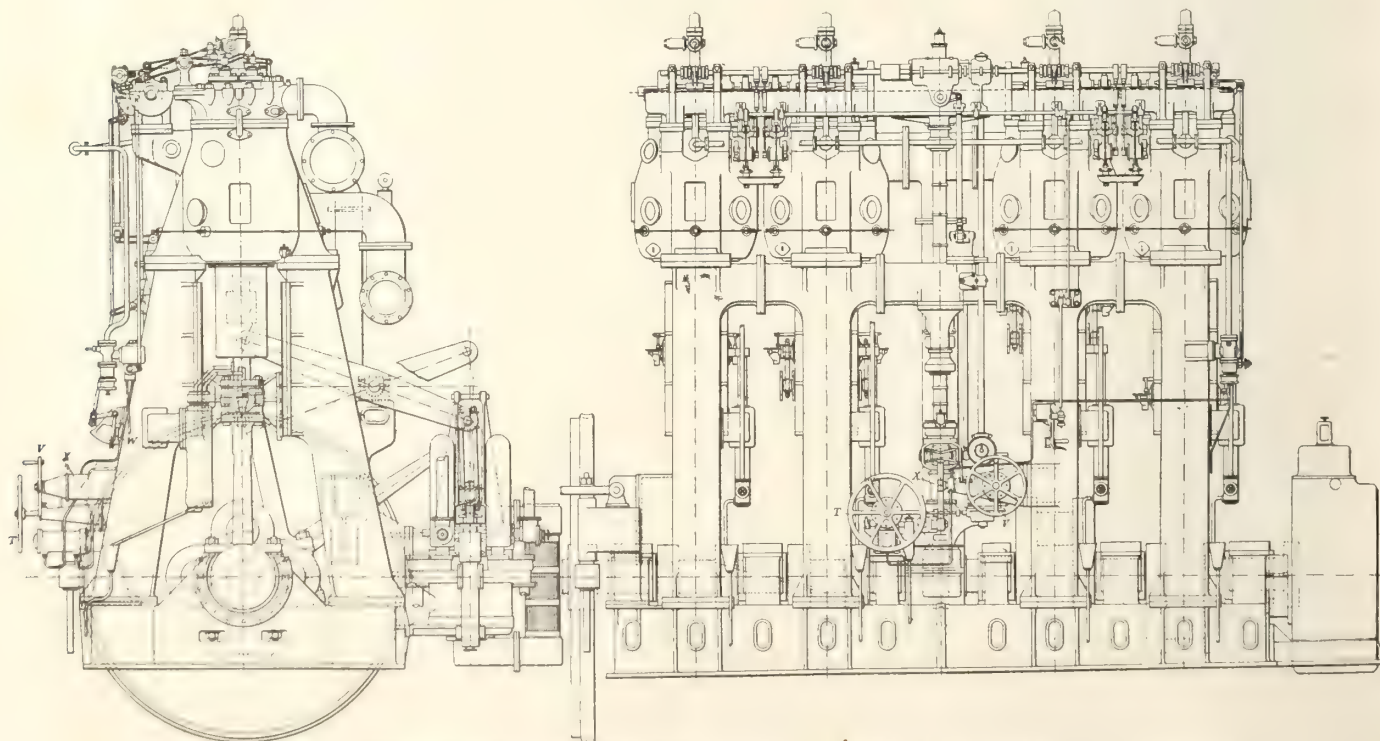


FIG. 2 "CARELS-DIESEL" PROPELLING ENGINES, CANADIAN INTERLAKE VESSEL "FORDONIAN."

The valve and manoeuvring-gear at first sight, may appear complicated, but this is not the case. It is true that, compared with some designs, it is composed of many parts, but the function of each is simple and definite. This vessel on her regular route from Montreal to Port Arthur must pass, each trip, through some 30 to 40 locks, and this demands manoeuvring qualities far above the average, and that the engines must be capable of being stopped, started, and reversed in a very short time. Stopping from full speed ahead was on trial accomplished in two or three revolutions of the main engines, and reversals from full ahead to astern took six seconds. A trial manoeuvring was made, and reversals were carried out from orders given from the bridge to correspond with the actual conditions in service of this vessel; 63 reversals were accomplished in 42 minutes, with more than half of the high-pressure compressed air still unused. The auxiliary steam-driven compressor was, of course, in use for this trial.

The system of having one fuel-pump for each cylinder makes for easy regulation of the quantities of fuel-oils supplied, and so permits of a very slow speed of revolution. On the trial trip forty-six revolutions per minute was the minimum attained; but when the final tuning-up has been accomplished, and all cylinders at all speeds are developing exactly the same power, a minimum speed of revolution of about thirty-five revolutions will no doubt be achieved. No governor is fitted, as rough weather is not normally encountered, and the heavy fly-wheel, some 9 ft. in diameter and about 7 tons in weight, is relied upon.

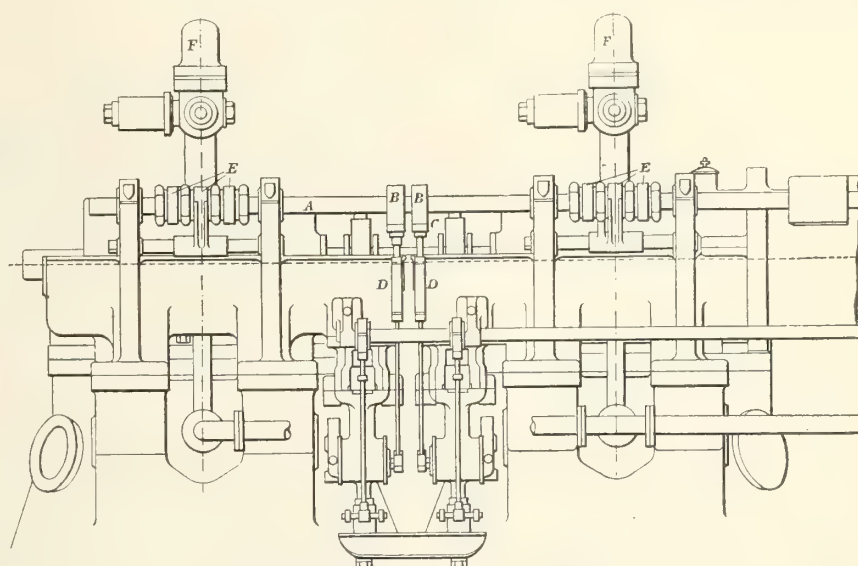
Compressor Unit.

The compressed air for the injection of the fuel-oil into the working cylinders, and also for the starting of the engine, is supplied by a Reavell's marine type reversible three-stage compressor. The compressor is an integral part of the Diesel engine, and as such is rightly driven from the main engine. The Reavell compressor is bolted on to the bed-plate at the forward end, and is driven by a pin off the crank-shaft. The stroke is 8 in. ($7\frac{3}{4}$ in. net), allowing for the $\frac{1}{4}$ in. auxiliary ports; and the diameters are: two low-pressure cylinders, 15 in.; one intermediate cylinder, $9\frac{1}{2}$ in.; and one high-pressure, $4\frac{3}{4}$ in. The volume of free air per minute dealt with by this compressor is 6,200 litres, and it was noted on trial that the air was supplied cool. This is an important point, as explosions have been put down to lubricating oil in suspension in the heated air. This compressor has multitubular inter-coolers.

As well as the main compressor and the scavenging air-pumps, the cooling-water and bilge pumps are driven off the main engine. The cooling water and bilge pumps are driven off the scavenging air-pump links in the same way that these pumps are driven off the links of the air-pump with mercantile steam-engines. The bilge-pumps in this engine are of larger capacity than is usual, because, it will be remembered, the cooling water from the pistons and guides drains to the bilges, as well as any leakage occurring with the plungers for water piston-cooling. The cooling water from the cylinders and cylinder-covers is led to a trough placed high up in the engine-room, in which trough all discharges are

vided is about one hour. The remainder of the auxiliaries are normal steam practice, and call for no special mention.

The weight of the main engine alone is about 100 tons, and if the auxiliaries are included, all ready for work, 150 tons is the weight of machinery aboard. There is fuel storage in two oil-tanks placed on both sides of the oil-fired donkey-boiler, and two ready-use tanks are placed aft of the engine-room, and are provided with steam heating coils, whilst the oil is filtered, on its way to the fuel-pumps of the main engines, through 15-gallon filters in the engine-room. In all, 105 tons of oil fuel is carried, whereas with the sister steamships 250 tons of coal is required. The con-



ENGINE DETAILS, "FORDONIAN."

visible. From there the water goes overboard.

Auxiliaries.

The auxiliaries are steam-driven from a cylindrical donkey-boiler, situated aft on the awning-deck in the fore part of the engine-casing. The boiler is fitted with the Wallsend Slipway and Engineering Company's oil-burning gear. The boiler uses exactly the same kind of fuel as the main engines. The auxiliaries are: the dynamo, auxiliary compressor, ballast-pump, oil-fuel pumps, three winches, a windlass, and steering-gear. The auxiliary steam-driven compressor is of half the capacity of the main compressor, and runs normally at 300 revolutions per minute. Air storage for starting purposes is provided by four welded steel bottles, of $23\frac{5}{8}$ in. diameter by 8 ft. long, and that for fuel injection by one bottle, 1 ft. in diameter by 3 ft. long. The pressure of the fuel injection air and the starting air is 850 lbs. per sq. in., and for slow-running engines, such as this, this pressure is quite usual practice. The time taken by the auxiliary compressor to fill up the air storage pro-

sumption per day for all purposes is 5 tons of oil fuel, against 14 tons of coal.

Fuel Consumption.

The fuel consumption of this engine is 0.47 lb. per brake horse-power per hour, and this is good practice for two-stroke cycle engines with the scavenging-pump and air-compressor driven on the main engine. Inspection of an indicator diagram showed that combustion was good and that the bore-stroke ratio adopted by Messrs. Carels, together with the main features of the scavenging design, ensured an efficient and complete combustion. The pressure of compression is 490 lbs. per sq. in. The fuel injection line showed a good adjustment of the fuel-valve for the fuel used, which was Scotch shale oil. The mean effective pressure from this card is 90 lbs. per sq. in., and is the usual figure under normal conditions, without any attempt at forcing. The indicated horsepower at 102 revolutions per minute and 90 lbs. per sq. in. is 970; 10 knots were achieved with the engines doing 128 revolutions per minute. The maximum revo-

lutions were 140, the normal about 102, and the minimum, 46. The results will undoubtedly be improved upon when the engines are finally tuned up, as prior to the trial trip they had only been run in dock trials for twelve hours in all. This is exactly the same treatment as is given to steam-engines.

The general arrangement of the engines and auxiliaries is well thought out to give the greatest possible immunity from breakdown. This is a point of some importance with single-screw ships propelled by a comparatively new prime mover. This type of engine seems very suited to the propulsion of cargo boats, and the saving in space consequent upon the adoption of the Diesel engine for this ship is five frame spaces, aggregating 10 ft., some 33 per cent. of the machinery.

A LARGE RUDDER.

THE accompanying cut shows the rudder for the Allan liner *Calgarian*, now being built in the yard of the Fairfield Shipbuilding and Engineering Co., Ltd., at Govan, Glasgow. The rudder, which is believed to be the largest ever made in two pieces—the top portion weighing 27 tons and the bottom portion 15 tons, came from the Sheffield Works of Cammell, Laird and Co. The spigot and faucet joint is planed, and the pieces connected by sixty 2½-in. diameter turned and fitted steel bolts. The body of each portion of the rudder has been cored out, leaving a wall of a minimum thickness of 2 in. The stalk was cast solid and afterward bored out to ensure perfect soundness, and also for lightening purposes.

The total height of the rudder is 26 ft. 6 in., the extreme width 21 ft., and the total weight 42 tons. The casting was completely machined at Cammell, Laird's Grimesthorpe Works. The upper portion of the rudder, owing to the exceptional overall size, was transported by road to Manchester docks, for shipment to Govan. Cammell, Laird have just completed and delivered two similar rudders to the Fairfield yard, for two steamers for the Canadian Pacific Railway Co., but these were slightly less in width and weight than that shown.

THE CUNARD LINER AQUITANIA.

SO far as the shipbuilding industry of the Clyde is concerned, the greatest event of the present year will be the launch of the huge Cunard liner *Aquitania* by John Brown & Co., Clydebank. From which establishment and from practically the same berth, the Cunard Company's *Lusitania* was launched

about six years ago. The precise date of the launch has not yet been officially announced, but it is understood that provisional arrangements are being made for floating the vessel either on Tuesday, April 22nd, or Wednesday, April 23rd. The hull of the vessel is fully plated from stern to stern, only a few openings having been left along the bilges for the admission of workmen and materials. All the decks, transverse and longitudinal bulkheads and other structural essentials have been completed. The standing ways are almost wholly laid, and the work of temporarily fitting the sliding ways and launching cradle is very shortly to be proceeded with.

Dimensions and Tonnage.

The launching weight of the *Aquitania*, including launching cradle and sliding ways, will be somewhere in the

lieved, the Cunarder is somewhere in the neighborhood of 900 ft in length on the load-line, the advantage will lie with her as regards tonnage at least.

Speed Feature.

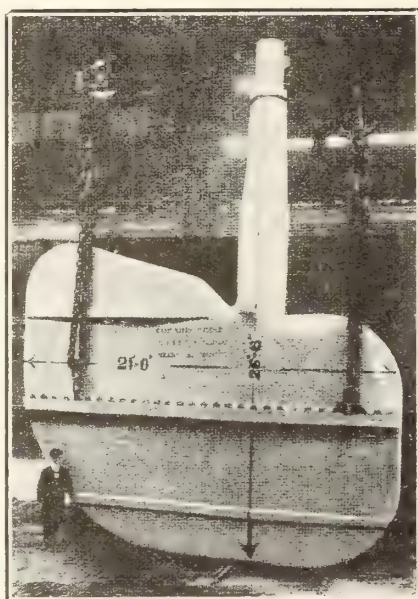
Regarding speed, there is doubt as to the intended qualities of the new Cunarder as compared with those of her German rival, because in neither case has any certain pronouncement been made. Both vessels will be propelled by turbines driving quadruple screws. In the case of the German liner, the aggregate power to be developed has been given as 72,000 S.H.P. The turbine generators are 18 ft. diameter, the shafting 18 in. diameter, and the propellers 16 ft. diameter. It has been authoritatively stated that the *Aquitania* has not been designed with the view of eclipsing, or even rivalling, the speed obtained by the 25½-knot *Lusitania* and *Mauretania*, but that, with the other great aims in her design, and construction as a modern ocean liner of the highest class, a speed of 23 knots will content the owners; and, as is most likely, may quite satisfy the average voyager.

Construction Provisions.

The berth on which the *Aquitania* is being constructed, while virtually that on which the *Lusitania* was built, was subject to some extension and consolidation for the much larger and heavier ship. Before laying the keel blocks in March, 1911, it was found necessary to lengthen considerably the berth and alter its angle to the river, principally to secure a freer launching run. To deal effectively with the work of construction, the builders also installed a very complete arrangement of electric jib cranes having lattice girder standards.

Structural Features.

While no information as to structural detail or scantlings is available, it goes almost without saying that every care and attention has been given to the vital question of water-tight subdivision and life-saving appliances. In addition to numerous transverse water-tight bulkheads extending well above the load water-line, the hull is subdivided by strong longitudinal water-tight bulkheads arranged in a similar manner to those in the *Lusitania* and *Mauretania*. The new vessel has also a water-tight lower deck extending throughout her whole length. The total number of persons she will be capable of carrying approaches 4,500, and the provision to be made in the way of lifeboat accommodation—taking the form of ordinary lifeboats, motor boats, and decked lifeboats with collapsible sides—will be ample for all on board.



RUDDER FOR ALLAN LINE S.S. CALGARIAN.

neighborhood of 27,000 tons; in this respect exceeding the corresponding weight of the Hamburg-America Company's new leviathan *Imperator*, launched from the Vulcan yard at Stettin on May 23rd last, and now approaching completion at Hamburg. The gross tonnage measurement of the German ship has been given as 50,000 tons, and that figure at least will be reached, if not considerably exceeded, by the new Cunarder. Strict reticence, as is well known, has been maintained with regard to her exact dimensions, but it has been openly and frequently claimed, without correction, that as regards dimensions, general arrangement, and propulsive efficiency, if not of absolute speed, the new vessel is intended to vie with the *Imperator*. The dimensions of the *Imperator* are:—Overall length, 919 ft.; beam, 96 ft.; and tonnage, 50,000 gross. If, as is be-

MARINE ENGINEERING OF CANADA

Machinery and Hull Fittings.

The turbines will be arranged in series upon the same system as that adopted in the case of the recently completed French liner *France*, and followed in the *Imperator* and the other two large vessels now being built for the Hamburg-American Line. Steam will be provided by cylindrical Scotch boilers working under forced draught. The after portion of the hull, corresponding to the "deadwood," is cut away in the same manner as in the *Mauretania* and *Lusitania*. The stern frame, rudder and propeller brackets, which are of massive construction and of cast steel, were supplied by the Darlington Forge Co.—which firm was responsible for the same details not only of the *Lusitania*

shafts 20ft. and diameter of bosses 4ft. 3in. The distance between the forward and the aft brackets is 86 ft.

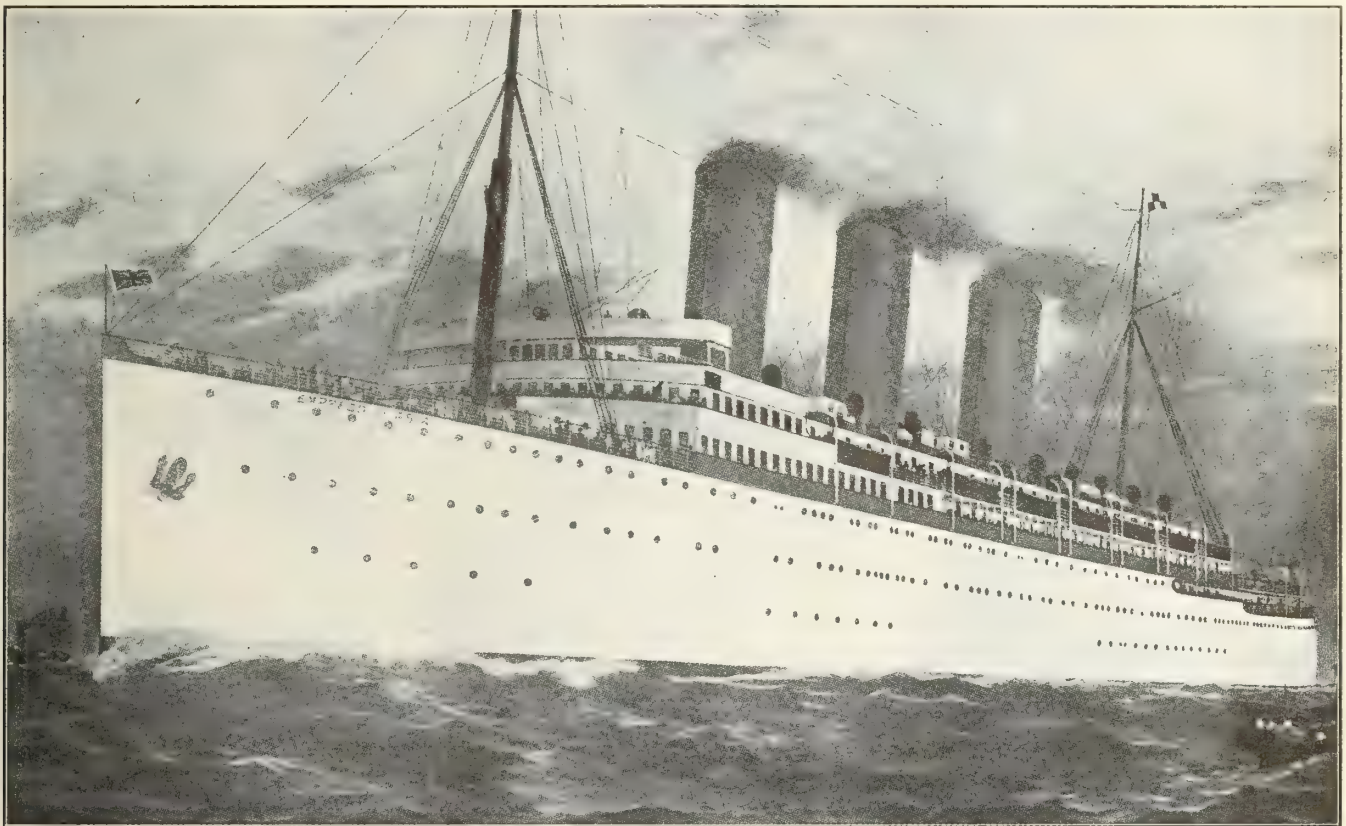
General.

The propellers and the rudder have yet to be fitted to the hull, but this, like the closing in of the shell, the painting of the huge structure, and the other necessary work pertaining to the launching make-up, will not overtax the working forces at Clydebank in order to have all in readiness for the 22nd or 23rd April. About one year will be occupied in completing the vessel afloat, and she should be ready for trials in the spring or early summer of 1914, the immense ship being thus completed within the period of two years. The *Aquitania* will,

and west coasts of the Dominion. With regard to the Pacific coast, we are forced to the conclusion that warship construction there would be at present carried on under such difficulties as to supplies of labor and material as to render prices for the building of your proposed warships quite prohibitive. On the Atlantic coast our consideration of suitable localities for the proposed works has mainly been confined to Sydney and St. John.

Too Much Ice at Sydney.

As regards the former, we cannot find that there is any prospect of immunity from serious interference during the winter from pack ice, which in our opinion would be most detrimental to the



NEW C.P.R. LINER "EMPRESS OF ASIA," AS SHE WILL APPEAR WHEN COMPLETED.

and *Mauretania*, but also of the White Star liners *Olympic* and *Titanic*.

The stern frame and propeller brackets are cast of Siemens-Martin mild steel of special quality. The rudder is of solid cast steel, built in three sections, while the rudder head, 25 inches outside diameter, is of forged ingot steel of the quality used for gun jackets. The weight of the stern frame and brackets is 130 tons, of which 50 tons is represented by the main piece of the stern frame, which was cast in one piece; 33 tons by the after brackets, and 35 tons by the forward brackets. The forward brackets have centres of shafts 57ft. and diameter of bosses 4ft. 3in., whilst the after brackets have centres of

for a time at any rate, be the largest vessel sailing, under the British flag, although she will ultimately be deprived of this distinction by the White Star liner *Britannic*, now on the stocks at Belfast.



HOW ST. JOHN LOST A SHIPYARD.

PUBLICATION is made of the tender Messrs. Cammell, Laird & Co., Ltd., of Birkenhead, England, made to the late government for the construction of ships at St. John, N.B. In their tender they say:

We have carefully studied the comparative claims of numerous locations, both on the St. Lawrence and on the east

operations connected with the building, docking or repairing of vessels of every class, but especially with warships. We believe that strategically and practically the only location which will meet with approval is one in which there should be no possibility of interference from ice during the winter months.

We have therefore decided upon St. John, N.B., as affording the most natural and advantageous site for the proposed shipyard, dry dock and other associated works, and we enclose two plans, No. 1 being a key plan showing the proposed site, and No. 2 being a complete proposition for a shipbuilding plant capable of handling the largest amount of warship construction

which is likely to be required for many years.

Started to Come Here.

In order to acquire the site for the proposed shipyard, we have entered into negotiations with a firm of contractors located in Canada, and provided satisfactory arrangements can be entered into with this firm in respect to the provision and handing over of the site with the necessary buildings, launching ships, etc., etc., we are prepared to equip the same with sufficient machine tools, power plant, cranes and other requisites for carrying out the programmes of your department.

Our price for each of the four cruisers of the improved Weymouth type will be the sum of \$1,950,000, and our price for each of the six destroyers of the "River" class of the Acorn type will be the sum of \$580,000. The vessels when completed will be handed over to the Minister of the Naval Service in the harbor of St. John."

Deposit Was Returned.

Messrs. Cammell, Laird and Co. put up a deposit of \$100,000. Their tender was the lowest. The old Government returned the deposits of all tenderers except Messrs. Cammell, Laird and Co. They did not, however, accept this tender, but left it to the new Government, which returned the deposit and decided on the new naval plan now before the Canadian people.



PRIZE FOR LEYLAND LINER.

WITH one of the most valuable marine prizes brought to Halifax in recent years, the Leyland liner Devonian, from Boston to Liverpool, arrived there on February 4, towing the crippled French liner Mexico, of the Compagnie General Transatlantique, from New York to Havre.

Late Thursday evening, January 30, the Devonian, after an almost twenty-four hours search over the waste of waters south of Sable Island, directed only by the wireless "S.O.S." call for help, succeeded in locating the Mexico. Shortly after midnight a cable had been passed to the crippled liner, and the prows of the ships were towed toward the nearest port of refuge—Halifax. At the end of four days of strenuous combat with head winds, huge seas, and adverse weather conditions, the Mexico, with her rescuer plowing along four hundred yards ahead, pulled into port, her propeller shaft broken, her decks washed by the seas, and her cargo so shifted that the ship had a list of fifteen degrees to the starboard. The Devonian remained in over night, sailing again the next morning, after having replenished her bunkers for the voyage to Liverpool.

NEW STEAMER LINTROSE.

THE mail and passenger steamer "Lintrose" which is being built to the order of the Reid Newfoundland Co., of St. John's, Newfoundland, at the Neptune Works of Swan, Hunter & Wig-ham Richardson Ltd., was successfully launched on Tuesday, January, 21.

The vessel is very finely modelled and is exceptionally strongly constructed for running through ice, which she will frequently encounter on her service, between Newfoundland and the mainland. She is to have accommodation for over 80 first class passengers, including three special rooms for one passenger each and a ladies' room holding ten. The passengers will have a fine smoking room on the promenade deck and a dining saloon with ladies' room on the shelter deck, all amidships. In the after part of the vessel there will be accommodation for 150 second class passengers. Both the promenade and the shelter deck will form spacious promenades for passengers.

The steamer will be fitted with single screw triple expansion engines, supplied with steam by three large boilers, the whole being constructed at the Neptune Works. The machinery is expected to propel the vessel at a speed of 15½ knots per hour. She is 225 feet in length by 37 ft. beam, and in addition to the usual installations of electric light, steam heating, etc., will be fitted with wireless telegraphy.

The christening ceremony was gracefully performed by Miss Lois Reid, daughter of the President of the company, and among those present at the ceremony were Mr. H. D. Reid, vice-president of the Reid Newfoundland Co. and Mrs. W. D. Reid, wife of the president of the company and others.



TITANIC DISASTER DELAYS SHIP-BUILDING.

THE Montreal superintendent of the White Star line, Mr. P. V. G. Mitchell, states that one of the effects of the Titanic disaster has been to retard the construction of nearly every big vessel on the stocks of European shipbuilding yards, in order that additional safety appliances may be installed. Information has just been received in Montreal that the mammoth liner "Olympic" practically re-built, will shortly leave the Belfast yards of Messrs. Harland and Wolff, and will sail from Southampton for New York on April 2. Into the "Olympic" there has been introduced an inner skin of heavy steel plates, continuing in effect the present double bottom, but bringing it well above the water line,

and providing considerable additional protection throughout the hull.

A number of additional bulk-heads of exceptional strength are being placed throughout the steamship, several of them reaching as far as the (B) deck which is forty feet above the water line. These new bulkheads and the new inner skin will greatly increase the liner's capacity for floating after a possible injury, and enhance the margin of safety far beyond previously recognized standards.

The new 'Britannic' is one of the vessels whose construction has been delayed in order that she might benefit by the bitterly learned lessons of the 'Titanic,' but this 50,000 ton triple screw steamer is expected to be ready for the Atlantic trade next year. Similar safeguards to those which have been put into the 'Olympic' will be introduced into the 'Britannic.'



THE HEIGHT OF BIG WAVES.

SAILORS in modern times have never seen such waves as those described by early navigators, which were reported to rise to the height of 100 or even 130 feet. La Prouse asserted that he saw waves in the Pacific towering to a height of nearly 200 feet.

In these more prosaic days we can only say that the highest wave yet measured had an altitude of about 52 feet. That was in the Southern Ocean, a little north of the Antarctic Continent; and it is quite certain that the highest waves ever seen in that region did not exceed 58 feet. The highest waves ever observed in the Indian Ocean were about 40 feet, while those in the North Atlantic are from 25 to 29, and in the Mediterranean from 16 to 19 feet.

Even the smallest of these mighty waves has great destructive power, for they often travel at a speed of 25 miles an hour. A wave 30 feet high contains thousands of tons of water, and when this immense force is exerted against any structure, the ruin wrought is likely to be impressive.

The great size of waves in high southern latitudes is explained by the fact that south of the Cape of Good Hope and Cape Horn there is neither windward nor leeward shore, and the prevailing winds are westerly. Thus, when a westerly gale springs up, it finds a long westerly swell, the effect of a previous wind, still running. The newborn wind increases the steepness of this swell and forms majestic storm waves that sometimes reach a length of twelve hundred feet from crest to crest. The average height in feet of sea waves is about half the velocity of the wind that causes them, reckoned in miles per hour.

The St. Lawrence River Pilotage Investigation

The commission appointed by the Dominion Government to investigate pilotage conditions as they presently exist on the St. Lawrence, has commenced its sittings, and the accompanying data contain a condensed account of the proceedings up to the time of our going to press.

THE inaugural sitting of the recently appointed Pilotage Commission, consisting of Captain Lindsay, wreck commissioner, Montreal; Mr. Thomas Robb, secretary of the Shipping Federation, and Mr. A. Lachance, of the Quebec Pilotage Association, took place on Thursday morning, February 13, in the Council Chamber of the Board of Trade, Montreal. The session was devoted chiefly to the administration of the Montreal Pilotage Association since its functions were taken over from the Harbor Commissioners, dealing particularly with the apprentice pilot.

In opening the session, Capt. Lindsay, who presided, read a communication from the Minister of Marine and Fisheries, stating that the Commission owed its origin to the large number of strandings that have taken place on the St. Lawrence route during the past few years, for which the pilots have been held largely responsible.

Capt. James Riley, superintendent of the Montreal Pilots' Association, was the first witness to be examined, and an inquiry into the personnel of those in charge of the piloting headquarters at Montreal and Quebec, and their duties and efficiency, was made. The matter of the pilot apprentices was then taken up and formed the feature of the investigation.

Apprentice Pilots.

Capt. Riley said that at the present time the association was running short of apprentice pilots. The number of licensed pilots, he said, was limited to 50. The apprentice pilot, during his long term of apprenticeship received no remuneration, while the requirements were severe and entailed years of service. Thirty trips must be made on the river by junior apprentices, and three trips to Europe, after which he graduates into the rank of selected apprentice, calling for fifty more trips before he became qualified to have his name placed upon the waiting list. For this he received no remuneration, and even after having qualified he was liable to remain inactive on the waiting list for years, during which time he must always hold himself in readiness for service. During his course of apprenticeship he was also compelled to be in constant readiness to go up the river with regular pilots, which prevented his accepting regular employment, and kept him idle.

It is likely that this matter will be taken up by the commission, and efforts made to establish some basis of remuneration for apprentices. Other matters, such as courses to be laid down on the river, reports made by pilots when detention occurs, and the examination of pilots, were investigated. Referring to the examinations, Capt. Riley said: "They are very gruelling, and occupy about two days, the examinations being conducted by a committee appointed by the Minister of Marine and Fisheries."

One Pilot for the Season.

At the second day's hearing of the commission, the first witness examined was Mr. Leslie Ward, joint manager of the New Zealand Shipping Co., who said that the pilotage system adopted by them, that of employing one pilot for the entire season, was more satisfactory than the choosing of different pilots from the waiting list as they were needed.

The Signal Service.

Mr. Tanerede Robillard, who has charge of the Signal Service of Montreal, was then examined, and questioned regarding the means of communication along the St. Lawrence route, and the facilities for reporting strandings, obstructions, etc. He said that between Montreal and Quebec there were twelve signal stations, eight of which were in commission day and night. The advisability of having a night service for the remaining four was discussed, and action will probably be taken in this direction. Communication by telephone and Marconi in case of emergencies was also discussed.

Mr. Alberic Angers, a member of the Pilot Association Committee, said that the pilots now on their list were all good men, were giving satisfactory service, and that no complaints had been received from the steamship companies. The question of special pilots selected by steamship companies was raised, Mr. Angers stating that this system met with the approbation of the Pilot Association.

The Survival of the 'Fittest.'

In dealing with the official waiting list or tour de role, as it is called, Mr. Angers gave a luminous account of the tribulations of the old system before the waiting list was established. "Two pilots would get on a ship," he said, "and a fight would determine who took her up or down the river, while the amazed

Captain would be a silent onlooker, fearing to interfere lest both should desert him. Then, too, the pilots in those days had a disconcerting habit of getting drunk, and no association existed to reprimand them."

Numerous practices were in vogue to secure the piloting of a ship, he continued, oft-times the aspiring pilot getting a school boy to write a letter to the captain informing him of the self-constituted fact that he was the allotted pilot. This he would present saying, 'I am your pilot,' and if he was first on board, he probably would be, if no pilot of more muscular build arrived. The establishment of the association and the tour de role, brought order out of this chaos and to-day the system in vogue ran smoothly and satisfactorily.

When asked where the pilots stood respecting compulsory pilotage, he said: "We don't want compulsory pilotage, and will take good care that it does not come," giving as his reason that it would make the Association responsible for damages.

A Sensation.

The mention of graft and corruption in connection with the employment of pilots by certain steamship lines created a stir. Mr. Angers was asked to prepare a written report regarding this matter, and hand it to the Commission. Dealing with the remuneration of pilots, Mr. Angers said, "There is no good living in it for anybody; one-fourth of what we earn must go for expenses."

Tariff Pilotage Fees.

With regard to the tariff pilotage fees, Mr. Andrew Allan, who was the star witness, expressed himself willing to see that tariff increased. He thought the Montreal pilots deserving of consideration, and from discussions that had taken place at meetings of the Shipping Federation, thought that many other shipowners would agree with him, but he was decidedly in favor of the system of special pilots, as otherwise the largest vessels would not come to Montreal.

Suggestions re Apprentices.

The chairman of the commission, Captain Lindsay, made a suggestion of which more may yet be heard, that something might be done along the lines of the Mersey Harbor Board, to which apprentices on the Mersey are bound, receiving in return board, lodging, and education free. On the Hoogly and the Thames, candidates for a pilot's license were apprenticed to Trinity House on somewhat similar terms.

Commissioner Lachance suggested that the selected pilots might be apprenticed to the Marine and Fisheries Department, and the suggestion seemed to meet with approval. The consensus of opinion among all present was that

selected apprentices should be maintained during their apprenticeship, though there seemed considerable doubt as to who would do the maintaining.

Captain Riley's Plan.

Captain Riley finally submitted a suggestion, which met with much favor, for the amelioration of the condition of the selected apprentices. The other apprentices he pointed out could hire themselves to barges and colliers and earn a livelihood without difficulty. During the last nine years, apprentices had been licensed at the rate of only five in two years. He thought the number of selected apprentices should be only four instead of seven, as they could then make their 50 trips in less time than now. Again, in October or November, they could be allowed to ship as third mates on seagoing ships for the winter. The Elder-Dempster Co. were often willing to allow candidates for a pilot's licence to ship as third mates. At present, the selected apprentices had to go to New York or Halifax to get a ship because the navigation season was over by the time they had made their 50 trips. The total number of apprentices, including the selected, should be limited to 20.

Allan Line Regular Pilots.

Among other features of Mr. Allan's evidence, in the course of which he paid a high encomium to the work done by Captain Riley, as superintendent of pilots, were that the Allan line employed five regular pilots on their steamers between Montreal and Quebec. He believed the system of special pilots was a very satisfactory one. The control of the pilots was much better vested in a master mariner of commanding personality and with ideas of discipline, than in such a body as the Harbor Commissioners. He was not there to pay compliments but Captain Riley's control of the pilotage system could not in the opinion of witness, be improved upon. No board could do as well, for it was unlikely that its members would have knowledge of the handling of ships and navigation.

Mr. Allan also advocated that the present system of oral examination of candidates for the position of pilot should be supplemented by written papers, so that a record might remain of the candidate's attainments, especially in mathematics and navigation. He thought a pilot should be retired at the age of 65, but that a position on shore should, if possible, be found for him then, and recommended the signal service as a most suitable department for the employment of the superannuated pilot.

Shortcomings of Pilots.

A scene seemed likely when Captain Riley, superintendent of pilots, refused

to produce certain papers for which the commission asked, on the ground that they related to past shortcomings on the part of certain pilots for which they had already been punished, and that to make the papers public would be, in effect, to punish the men again. Finally, Captain Riley yielded to the demand of the commission, under protest, stipulating also that the contents of the papers should not be published.

Earnings of Pilots.

The evidence given by pilots at the morning session went to show that the emoluments of their calling are uncertain. Pilot Hamelin stated that he knew of one pilot last year who had made \$4,000. He himself had made about \$1,500, and the least any pilot had made was about \$700. Another witness testified that after taking a ship to Quebec he had waited there nearly three weeks before getting a ship for the return trip, and after deducting his expenses for the period, he was \$5 short.

A suggestion made by Pilot Angers appeared to impress the commission. It was in effect that all pilots should be placed on the tour de role, but ship-owners should be free to select the pilot they desired from the waiting list instead of being limited as to choice to the three first names.

Reporting Accidents.

"What makes Commissioner Lachance think accidents occur in the St. Lawrence River which are not reported?" asked Pilot Wilbred Gauthier. "Our orders from the steamship companies are to report accidents, and there is also a by-law to that effect, and Capt. Riley is very insistent that such reports shall be made. There was a rumor that the Tunisian had touched at Cap a la Roche. It was false, but because of it, Captain Riley returned my report for an account of the accident to be added, and I returned it to him saying there was nothing more to report. Coming up from Quebec we are always near the bottom and banks of the channel, and sometimes it is believed a ship has touched when she has not."

Asked by Captain Lindsay as to what reports he had heard which inspired his question, Commissioner Lachance stated he had been told the Victorian had touched at Cap a la Roche and that no enquiry was held.

Captain Lindsay explained that Capt. Riley always reported every accident, however slight, to Ottawa, and then, if it was sufficiently serious, the Marine Department ordered an investigation.

Must Select Their Pilot.

Mr. W. R. Eakin, manager for McLean, Kennedy & Co., said that his firm felt with regard to outside steamers con-

signed to them that they should have the privilege of selecting the pilot instead of being tied down to one of the three first names on the tour-de-role. His only objection to any pilot now on the tour-de-role was that he did not know what the man's abilities were. He had formerly known one man on the tour-de-role that he would not have for the Head line on any consideration.

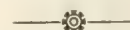
Mr. D. W. Campbell, who was the next witness, argued on somewhat similar lines. Pilot Hamelin had for a number of years proved himself a good man as pilot for the Elder-Dempster boats, but now he was leaving the line, as he was not making enough money, and so wished to go on the tour-de-role instead. Mr. Campbell wished that it might be made worth Hamelin's while to stay by allowing him to pilot the number of outside steamers consigned to the Elder-Dempster Co. as agents. The other pilots, however, objected to his piloting any but the South African boats. These were the largest freight steamers out of Montreal, and were loaded with cargoes of exceptional value, and the owners objected to be forced to take any pilot that might be on the tour-de-role. The pilot who handled a given steamer repeatedly, became acquainted with the peculiarities of that steamer, and so was the best pilot for it.

Competence of Captains.

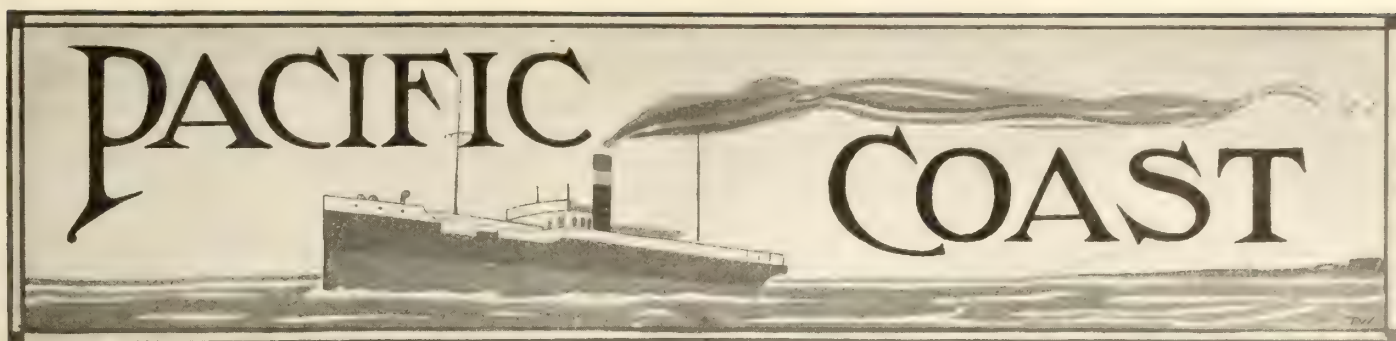
Mr. W. I. Gear, of the Robert Ford Co., expressed the opinion that a captain who had traded to the St. Lawrence for one year was competent to handle his ship without the assistance of a pilot. Mr. Wilbrod Gauthier, president of the Montreal Pilots' Association, took exception to the view expressed by Mr. Gear, and Pilot D. Perrault urged that a new branch should be established for pilots of slow vessels, as 15 hours on the bridge was too much for any man. Pilots of slow vessels should be relieved at Three Rivers.

Upon the suggestion of Mr. F. E. Meredith, K.C., who appeared for the Shipping Federation, it was decided to call a special meeting of the pilots to consider the proposal. The decision arrived at by this conference will be communicated to the Commission when its sittings are resumed at Montreal.

The Commission sat on Friday, Feb. 21, at Quebec.



Prince Edward Island.—The Government will call for tenders shortly for the construction of ferry slips for the new car ferry service from Prince Edward Island to the mainland. The terminals will be at Cape Traverse and Cape Tormentine, and their estimated cost will be from \$1,500,000 to \$2,000,000.



WIRELESS ON THE PACIFIC.

ONE after another, in rapid succession, there are being added aids to navigation all along the coast of British Columbia, making it already the best lighted and protected shore of any country. The present Minister of Marine is especially wide-awake to the needs of shipping, and is anxious that nothing should be left undone that may add to the safety of the large amount of shipping which uses the waters of the Province.

The line of wireless stations which has been set along the Coast is not equalled in any part of the Dominion or on any other coast. There are, to-day, ten of these in active operation, the tenth, which will be known as the Alert Bay Station, having been put into operation recently.

"C-F-D" will be the call for the new station, and needless to say, it will prove to be a great convenience to all shipping using the inner passage to the North. The station is perched on top of an eminence 150 feet high, and from it there will be a full view of all vessels passing north to south. It is at the upper end of Johnstone Strait, and vessels will be able to report their movements after leaving Chatham point.



TWO NEW SHIPS FOR THE C.P.R.

AN important statement of the plans of the Canadian Pacific Railway in reference to their coast service was made by Captain J. W. Troup, general manager of the British Columbia Coast Service, in Montreal, after he had consulted with the officials of the company. Captain Troup is at present in Great Britain, having gone there to look into the shipbuilding situation and the possibility of securing early construction of two new steamers.

Before he left, he gave a statement of the company's plans to the press, the tenor of which follows:

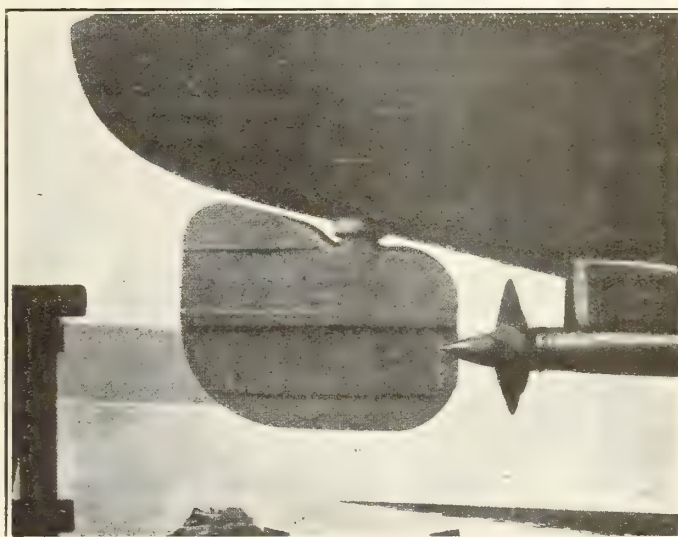
"Two new steamships are to be built as soon as possible for the British Columbia Coast Steamship Service to replace the Princess Charlotte and Princess Victoria, which are themselves new boats, but in view of the rapidly expanding business of the company on the

Pacific Coast and elsewhere are required for assignment to other routes."

Captain Troup admits that in view of the fact that the British shipbuilding yards are all congested with business, owing to the present boom in shipping, his mission is not an easy one, but he hopes to lose no time in placing an order for two very fast turbine steamers for the triangular route between Victoria, Vancouver and Seattle.

He said the new steamers were each to be of about 5,000 tons register, specially designed and adapted for the Bri-

financial report was an encouraging one and a dividend of 10 per cent. per annum and a bonus of 5 per cent. was declared, the dividend being out of earnings and the bonus from funds received in settlement of claim against the Craig Steamship Co., of Cleveland. The net earnings of the company for the year were \$82,598.95. The officers elected were: President, T. I. Thomson, Owen Sound; vice-president, E. R. Wayland, Fort William; secretary-treasurer and managing director, Geo. E. Fair, Collingwood; directors, T. I. Thompson, Owen



RUDDER AND ONE OF THE FOUR PROPELLERS OF THE NEW C.P.R. LINER, EMPRESS OF RUSSIA.

tish Columbia Coast Service, and it was intended that they should be the very finest steamers of their class. There was no fault to be found with either of the boats they will replace. The Princess Charlotte and Princess Victoria had more than come up to expectations, but they were wanted for other routes, as the business of the C.P.R. was expanding in all directions, so that it was difficult to keep pace with each new requirement as it arose.



FARRER TRANSPORTATION CO.

THE annual meeting of the Farrer Transportation Co. was held in Collingwood on January 28th, to receive the report of the directors and for the transaction of general business. The

Sound; E. R. Wayland, Fort William; E. Stubbs, Sault Ste. Marie; D. D. Lewis, Lorain; W. E. Allan, Toronto; W. T. Toner, Collingwood; M. Snet-singer, Thornbury; G. P. Pearsall, Collingwood; John Shultis, Port Colborne.

The directors discussed the question of building a new steamer, and it was practically determined that one of 12,000 tons capacity should be in operation by the spring of 1915. Good contracts have been made for both the company's steamers for the season of 1913. The "Collingwood" will carry ore from the head of the lakes, while the "Meaford" is chartered to carry pulpwood from the Island of Anticosti to Thorold, for the United States Pulpwood Co. The characters for ore already reach fifty million tons.

ANOTHER TRIUMPH FOR THE INTERNAL COMBUSTION ENGINE.

By H. A. Wilson.

THE places in which the internal combustion engine can be utilized seem to be unlimited. Every little while some new situation presents itself and the gasoline engine seems to be especially adapted for use under the peculiar conditions set forth herewith. The case of a ferry on the Bay of Quinte, Lake Ontario, is only one of a number of instances where history has repeated itself. However, the story is an interesting one. In this ferry boat, several drives were used, each an improvement on the previous one, the last being an up-to-date gasoline equipment. For years this ferry has been operated between Glenora and the historic village of Adolphustown. The first type of boat was a horse ferry. Two horses through the medium of tread mills were the prime movers in this primitive ferry. The paddle wheel was situated at the stern.

The trade increased, however, and demanded a boat more conveniently operated. A new ferry was built having two side paddle wheels which could be operated in either direction. This ferry was also driven by tread mills. By means of gears the power was transmitted to the wheel shaft. The reverse motion was accomplished by introducing an idler gear in the gear train. This boat did not fill the demands of the increasing traffic and was replaced by a steam ferry of the catamaran type, that is, one consisting of two separate hulls placed parallel to each other, a few feet apart, and decked over. The engine was mounted on one hull and the boiler amidships as shown in Fig. 1. The paddle wheel was between the two hulls, about amidships. The engine was of the stationary, horizontal, slide valve type, and steam was not used expansively. The engine had to run both ways, but its original design as a stationary unit admitted of operation in only one direction. However, reversal was accomplished without the use of an additional eccentric, as is seen in Figure 2. The link motion there shown could be utilized only because of the

fact that the steam was used non-expansively.

This engine propelled the ferry for years and gave excellent satisfaction, but was eventually superannuated and a gasoline engine installed in its place. The latter is also of the stationary type, being of the ordinary single cylinder, horizontal design, having a fly wheel on either side of the main bearings. It is rated by the builders at 20 h.p. The bore is 10 inches, the stroke 17 inches and its speed 250 R.P.M. By means of a simple adjustment of the governor, it can be operated with excellent economy at speeds considerably less than this. The engine is connected up to the pad-

This mechanism and transmission have been in operation for several months in which time they have been given a thorough test in all sorts of weather and have proved entirely satisfactory. In fact this drive has proved itself to be far ahead of any of its predecessors. The operating expense is just about half the cost of steam, for two reasons. Firstly, because of the extravagant and prodigal use of steam, and secondly, because of the peculiar operating conditions. The ferry makes no regular trips but remains on one shore until a vehicle arrives for passage across the Bay; or she is signalled that a vehicle awaits her arrival on the opposite shore. Thus she

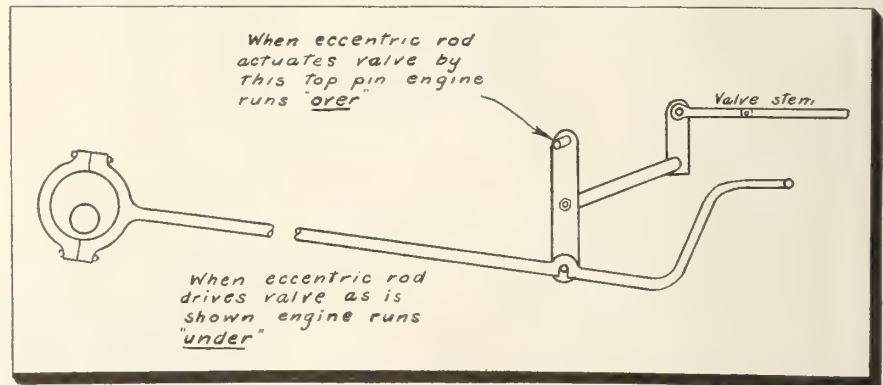


FIG. 2. ANOTHER TRIUMPH FOR THE INTERNAL COMBUSTION ENGINE.

dle wheel in rather a unique manner. It is placed where the old steam boiler originally stood, as shown in Figure 3. The crank shaft extends through the fly-wheel and has an extension of several feet coupled to it. Two friction clutch pulleys are mounted on this shaft and between them is a yoke to which a wooden lever is attached. When this lever is vertical, both clutch pulleys are released and the shaft runs idle. If pushed to the right, the right pulley clutches the shaft and drives, and vice versa. These pulleys are both belted to a counter-shaft, one by a straight belt, and the other by a twisted belt. On this counter-shaft are placed two wooden pulleys, and this shaft is connected to the paddle wheel shaft by means of two sprockets and a heavy chain. Control of the equipment is thus extremely simple.

may run constantly for two or three hours, or may remain idle for as long. At best the traffic is intermittent and not conducive to economical operation under steam. The actual distance between the two landings is about a mile.

INTERFERING WITH NAVIGATION.

IN the days when the Clyde was navigable to Glasgow for only very small vessels, a steamer stuck in the mud near Renfrew and the skipper was not sparing in strong language. While waiting for the rising tide he saw a little girl approaching the river with a bucket to fetch some water. This was too much for the poor captain, and, leaning over the side, he thus addressed her: "If you tak' ae drap o' water oot here till I get afloat, I'll warm yer ear for't."

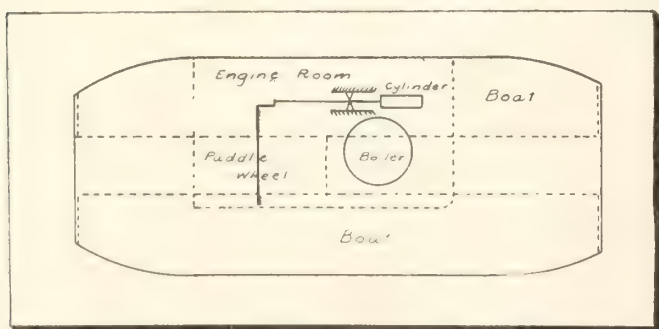


FIG. 1. ANOTHER TRIUMPH FOR THE INTERNAL COMBUSTION ENGINE.

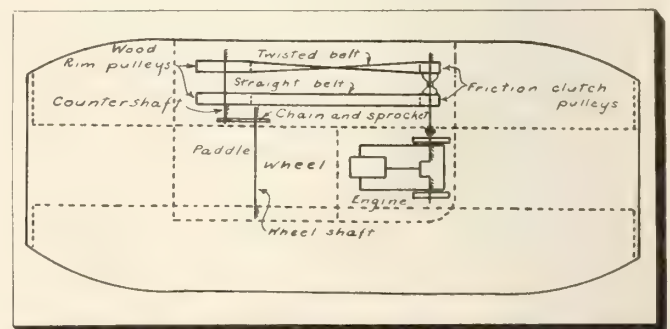


FIG. 3. ANOTHER TRIUMPH FOR THE INTERNAL COMBUSTION ENGINE.

THE NEW ALLAN LINER "ALSATIAN."

THE new Allan liner *Alsatian* which with its sister ship the *Calgarian* will ply between Montreal and Liverpool, will be launched on the Clyde on March 8, and will sail from Montreal for the first time on July 1. The *Calgarian* will be launched on March 19, and will sail from Montreal sometime during August. Both vessels are of 18,000 tons register, and will make from 18 to 20 knots an hour. They will represent in comfort, convenience, and spaciousness, the apex of the builder's art. These steamers will be the largest liners sailing between Liverpool and the Dominion of Canada. They will be driven by the latest type of turbine engines, operating four screws. The distribution of the power over four separate shafts reduces the vibration to such a degree as to make it almost imperceptible.

The passenger appointments of the steamers will embody every up-to-date device for the enjoyment of ocean travel, including a most perfect system of heating and ventilation. The fittings of the general rooms, which will occupy the entire structure on A-deck, will harmoniously blend luxury and comfort, the decorations being entrusted to firms whose names are world-famous. The public rooms will comprise the lounge, library and reading room, the card room

reputation for beauty and grace of design. They will be fitted with two pole masts and two funnels, and a striking feature in their appearance will be the "cruiser" stern, hitherto peculiar to warships. Safety is, of course, the paramount consideration, and the application of the latest design in ship construction and the adoption of the most modern equipment will be utilized to ensure this, including wireless telegraphy and the latest submarine signaling apparatus.

Two models of Allan ships have been on exhibition for some time at the Windsor Hotel, Montreal, and the House of Commons, Ottawa. These are the "*Alsatian*" above described, and the *Brig Jean* on which Captain Allan sailed to Canada in 1819. The latter was 76 feet long, just four feet longer than the *Alsatian* is wide. The models will shortly be on exhibition in the King Edward Hotel, Toronto. Nothing conveys to the eye, more strikingly, the immense advance made in Canadian shipping during the past century, than an inspection of these two vessel models side by side.

S.S. MANITOU BADLY BURNED.

CONSIDERABLE damage was caused by a fire that broke out on Feb. 2, on the Dominion Transportation Co.'s steamer *Manitou*. The vessel was

Captains Baxter, Wilson, Batten and McCoy. She was last season in command of Captain Norman McCoy, of Owen Sound. Her tonnage was about three hundred.

The origin of the fire is a mystery. A short while before it was noticed, Captain Batten, in whose charge the Dominion Transportation steamers winter, was on board the *Manitou*, and at that time there was no indication of fire.

R. & O. NAVIGATION ANNUAL.

THE annual report of the Richelieu & Ontario Navigation Co. for 1912, to be mailed to the shareholders, shows net profits of \$976,512. On the paid-up capital stock at the close of this year, this would represent a little less than 10 per cent. On the average paid-up capital stock of the year, however—the stock on which the company was paying dividends from quarter to quarter—the net profits were equivalent to 13.13 per cent., a much more favorable showing than was anticipated.

After meeting dividend requirements, adding \$36,000 to insurance fund and writing-off steamers, \$75,817, the company carried forward out of the year's profits \$269,531 to surplus, bringing the total surplus up to \$708,780. The gross receipts of the company were \$4,495,157, operating expenses, \$3,345,053, and fixed charges \$172,091.

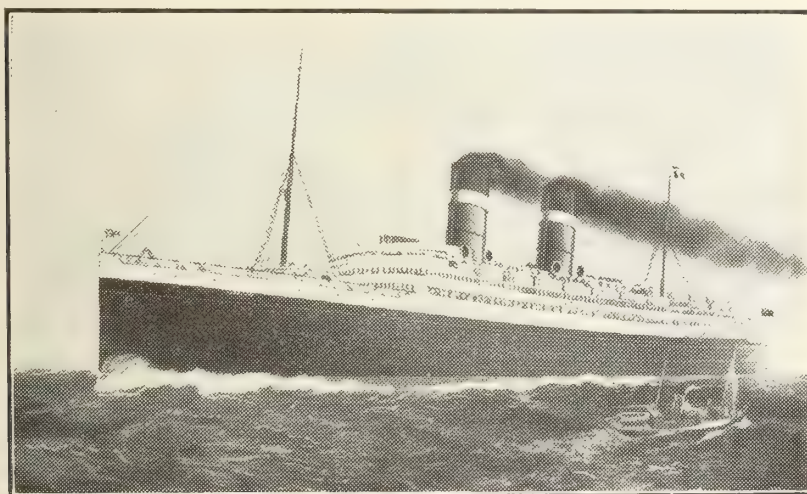
The President's report refers to the ordering of a new boat from the Western Dry Dock Co., of Port Arthur, Ont., for the Canadian North-West traffic, which boat will be considerably larger than the *Hamonic*.

U. S. NAVY ON THE GREAT LAKES.

WITH a view to strengthening the naval militia organizations of the Great Lakes, the United States navy department has recommended more training vessels of modern construction for the sailors of the inland seas, and a plan is being worked out for the establishment of a school of instruction for militia officers. The construction of eight militia ships is asked for by the department officials. These would be small tug-boats to be used by the States for practice purposes, and would be mobilized with the regular fleet of the navy in time of war.

OLYMPIC READY FOR SEA AGAIN.

THE alteration and partial reconstruction of the steamship *Olympic*, of the White Star Line, is practically completed. The vessel was towed out of Belfast drydock to deep water on February 19. The alterations have cost \$1,250,000.



ALLAN LINE NEW STEAMSHIP "ALSATIAN."

and the smoke room. On the upper promenade deck there will be a cafe, smoke room, and gymnasium. The promenade decks—which will constitute a special feature of the ships—are of great length and spaciousness, with extensive closed-in promenade for recreation in all kinds of weather. The steamers will carry 250 first-class, 500 second class, and 1,000 third class passengers.

Externally the "*Alsatian*" and "*Calgarian*" will maintain the "*Allan*"

wintering at Owen sound, Ont.. Despite all that could be done, the vessel sank at her moorings.

The loss cannot be ascertained definitely until the spring, when the ice goes out of the harbor, and the damaged boat can be raised. The *Manitou* was a wooden passenger and freight steamer, and plied between Owen Sound and the Manitoulin and north shore ports. She was built at Goderich in 1903, and since then has been on the Georgian Bay run. She was commanded successively by

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Vol. III

FEBRUARY, 1913

No. 2

SHIPBUILDING A STAPLE INDUSTRY FOR
CANADA.

A FEW days ago, representatives from the leading shipbuilding concerns established in various parts of Canada waited on the Federal Premier, Mr. R. L. Borden, and laid before him their ideas on the subject of the necessity of Government assistance in propagation of their enterprises. It was pointed out that a restricted sphere of operation was only, meantime, possible on account of the free import of Canadian registered, British built ships. In a word, protection of some effective kind was sought to offset the preponderance of production cost in favor of Great Britain.

The extension of the scope of the shipbuilding and marine engineering industry in Canada is generally accepted as but the natural outcome of the progress and development made during recent years, and the expressed desire on the part of her citizens to emulate the achievements of the Motherland, with respect to her own requirements as well as the winning of international maritime renown. As a "Nation within an Empire," no difference of opinion, amounting to anything material, exists relative to duty to ourselves and to the Empire whose nurture and protection has contributed so largely to our present status. Our industrial record continues to expand in well established engineering and manufacturing pursuits concurrently with agricultural and mineral wealth development, and in addition to the features of the protection of our shores, our transportation needs fall to be accounted.

The proposal to aid the Imperial Navy will meet with its strongest support by propagating already established

shipbuilding and marine engineering industries, and by furthering an increase in their numbers and scope. Readers of and advertisers in Marine Engineering of Canada have a large interest in this question, for in no one other individual completed product of man's inventive and constructive genius do so many accessory industries live, move and have their being. Shipbuilding and marine engineering embraces within its scope our iron and steel plants, our foundries and our machine shops, and, needless to say, in numerous cases, equipment for these compares on equal footing with the requirements of other sections of the engineering field.

The reported establishment by the United States Steel Corporation of an extensive plant on Canadian territory indicates the drift and trend of iron and steel trade affairs, and although much of the detail already arranged in this and other directions has been accomplished under cover of the increasing of our great railroads, the fact remains that the broader field, consequent on what might almost be called the inception of a new industry, that of shipbuilding and marine engineering, is the goal furnished by the provision being made to meet an early future demand. Again, the extensions to and modernizing of old established steel and iron foundries, machine shops, etc., in all of the leading industrial centres of the Dominion, have for their objective a coming boom time in Canada's trade and commerce, and anticipate, in no uncertain manner, the institution, on a much larger scale than hitherto, of the shipbuilding and marine engineering industry.



THE PILOTAGE COMMISSION INVESTIGATION.

WHATEVER may be the outcome of the investigation by the Pilotage Commission now sitting, it is generally agreed by those who have followed events on the St. Lawrence River below Montreal during recent years, that much room for improvement exists in the pilot system, and that the sooner confidence is restored in the men who are given control of the navigation of big liners in the confined waters of our great national highway, the more rapid will be the development and progress of this Dominion of Canada.

The pilots have a tour de role or waiting list, from which vessels entering the river are supposed to have a choice of the first three names. So afraid are the big shipping companies to trust to this tour de role, that one at least has threatened to keep its vessels away from Montreal rather than trust them to pilots indiscriminately.

Much has been said at the various hearings concerning the difficulties which beset the path of the St. Lawrence apprentice pilot, making it difficult to keep the organization up to a high state of efficiency, and this, coupled with other deficiencies all contribute to the stigma attaching to the St. Lawrence Route, and to the high insurance rates there prevailing.

We trust that the three men who have been appointed to conduct this investigation will leave no stone unturned until the pilot system on the St. Lawrence is placed on a pedestal of the highest efficiency.

MARINE NEWS FROM EVERY SOURCE

Ottawa, Ont.—Letters patent have been issued incorporating "Ocean Freight Line, Limited," of Toronto, with \$100,000 capital. The company is authorized to build or buy and operate ships.

Fort William, Ont.—There are locked up in this harbor, awaiting the opening of navigation, 24 vessels containing 12½ million bushels of grain. In the elevators there are 19½ million bushels, making a total of 32 million bushels, which is a new record.

Vancouver, B.C.—A company of Vancouverites, headed by Mr. E. H. Heaps, is planning a new steamship service from Montreal to Vancouver, by way of Panama.

Kingston, Ont.—For the first time this winter, on Feb. 7, ice made between here and Wolfe Island. This is the latest closing of navigation here in many years.

Ship's Surgeon.—All doubt as to the eligibility of women for the position of ship's surgeon, has been set at rest by a Scottish steamship company, who recently engaged a woman to fill that post on a liner bound for Australia.

The Malay States Dreadnought for the British navy will be christened "The Malaya." She will have a displacement of about 29,000 tons, will carry eight 15-inch guns and several smaller weapons.

The "Imperator."—The Hambourg American liner Imperator, biggest steamship afloat, will make her first trip from Hamburg on May 28 instead of May 7, as originally scheduled. The change in the plan of the line has been made to give ample time for an extended trial trip. Under the new schedule the Imperator should arrive in New York on June 4.

St. Lawrence Pilot.—The first edition of the St. Lawrence River Pilot (Below Quebec), comprising sailing directions from Portneuf (north shore) and Father Point (south shore) to Quebec, has just been published by the Hydrographic Survey, Department of the Naval Service of Canada. Copies will be supplied to mariners free of charge on application to the Hydrographic Survey Office, Department of the Naval Service, Ottawa.

Halifax, N.S.—Furness, Withy & Co., owners of the steamship Rappahannock, have libelled the steamship Uranium for \$50,000 services in hauling the steamer off the rocks at Chebucto Head. George Brister, owner of the steamship Bridgewater, which had previously been engaged in similar work to the Uranium, has also libelled her for \$30,000. The case will come up in the Admiralty Court.

Fort William, Ont.—Three thousand, eight hundred and twenty-four (3,824) vessels registered at the port of Fort William during 1912 as compared with 3,028 during 1911. The total tonnage of vessels during 1912 was 6,733,386 tons, and for 1911 was 5,514,810 tons, an increase of 1,218,576 tons.

Vancouver, B.C.—Owing to the rapid growth of business in this port, the Canadian Pacific Railroad Co. find it necessary to build another new pier from the foot of Granville Street, about 500 feet long, the contract for which has been let.

Vancouver.—The work of converting the "Princess Sophia," the newest of the C.P.R. steamers on the Pacific Coast service, from coal burning to that of oil, has been completed, and the vessel made her first trip recently. The Princess Sophia will later on go into the Alaskan trade.

Sault Ste. Marie.—A deputation representing the municipalities of Southampton, Port Elgin and Kincardine, headed by Col. Clark, M.P., and John Tolmie, ex-M.P., waited on the Government on Thursday, Feb. 12, to ask for a subsidy for a regular steamship service between Southampton and Sault Ste. Marie, and also for an appropriation for a breakwater and dredging at Southampton. Sympathetic consideration was promised.

Quebec, Que.—The discomfort and inconvenience to passengers arriving on the Intercolonial after midnight in not being able to cross to Quebec still exists. The Board of Trade has decided to bring the subject again before the Minister of Railways, and point out to him the fact that the government is bound to furnish service to passengers arriving at Levis

after midnight, and who have purchased tickets to Quebec.

Fort William.—The Algoma S. S. Co. has purchased two freighters from the Gilechrist Co. They are the Saturn and Uranus. Both are steel boats and will be used carrying rails from the Soo to Fort William. They are 340 ft. long, 48 ft. beam and 28 ft. deep and were built in 1901.

Toronto, Ont.—The Department of Public Works at Ottawa has awarded the Polson Iron Works a contract for machinery for a dipper dredge. The amount is \$38,000.

Vancouver, B.C.—A well-known officer of the Chinese customs, who was known to the mariners who sail between this port and the Orient, died recently in Shanghai in the person of Capt. Charles N. Palmer.

Collingwood, Ont.—The Collingwood Shipbuilding Co. have closed a contract with the Pelee & Lake Erie Navigation Co. for a steel combined passenger and freight steamer for the route between Pelee Island and Rondeau Harbor. The steamer will be 145 feet long, 24 feet wide and 18 feet 3 inches deep, and will be driven by triple expansion engines, with cylinders 12½ in., 21 in. and 34 in. in diameter, and a stroke of 21 inches. Steam will be supplied by one Scotch boiler 12½ feet in diameter, and 10½ feet long. The specifications call for a speed of thirteen miles an hour, and for delivery early in July.

St. John's, Nfld.—The annual meeting of the Phoenix Whaling Co. was held recently at Job's Office. The directors were all re-elected for the current year.

St. John's, Nfld.—The Reid Co.'s dock hands are busy repairing the company's fleet of steamers this winter. When those in port are done, the Glencoe, Invermore, and Bruce will come here for their annual overhauling.

Montreal, Que.—The Lake Champlain and Lake Erie, which are to be used in the C.P.R. Austro-Canadian service have been renamed. The Lake Champlain becomes the Ruthenia and the Lake Erie the Tyrolia.

Collingwood, Ont.—The St. Lawrence and Chicago Steam Navigation Co.'s steamship, which is under construction at Collingwood, will, it is claimed, be the largest carrying boat on the Canadian lakes. Her dimensions are as follows: Length over all, 550 ft.; length between the perpendiculars, 529 ft.; beam, 58 ft.; depth, moulded, 31 ft.; estimated carrying capacity, 10,000 tons. She will be equipped with triple expansion engines, with cylinders 24, 40 and 66 ins. diam., by 42 ins. stroke, supplied with steam by three Scotch boilers 13 ft. diam., by 11 ft. long, at 185 lbs. pressure. The furnaces, which will be equipped with forced draught, will have a grate area of 45 ft. to each boiler. She is being built with side tanks, six compartments, and there will be 31 hatches, spaced 12 ft. centres. She will not be launched until nearly completed.

Vancouver, B.C.—A new combination marine slip and elevator is being installed for the C.P.R. at the wharf where the Seattle and Victoria boats leave.

St. John, N.B.—With part of the bridge broken and one of her propellers missing, the C.P.R. liner *Montfort*, Captain Davidson, steamed into this port on the morning of Feb. 18, disabled, and crawled up to her berth at Sandpoint. The steamer left Antwerp on January 28, taking twenty days to make the trip which ordinarily would have been made in two weeks at the outside. Rough weather was encountered soon after the *Montfort* put to sea, and the big ship was buffeted about like a toy. On Feb. 5, while steaming along at a fairly good rate, one of the propellers broke off. Head winds and gales were encountered daily and considerable damage was done. The Captain reported having passed a derelict when off Cape Sable. There was practically no trace of anything to show what it was, with the exception of a mast sticking above water. Captain Davidson said that he had seen practically no ice on the trip.

Toronto.—The St. Lawrence and Chicago Navigation Company held their annual meeting last month end, in Board of Trade Building. The directors were again re-elected as follows: President, W. D. Mathews; vice-president, J. H. G. Hagarty; managing director, A. A. Wright; board of directors, E. B. Osler, C. S. Gzowski, J. R. Crow, James Carruthers and R. Crangle.

St. John's.—At the annual meeting of the tidewaiters, lockers and boatmen, of H. M. Customs, W. Kelly was elected president; S. Garland, treasurer and J. White, secretary.

Montreal, Que.—The Montreal Harbor commission has awarded a contract for a 1,500,000 bushel addition to its

elevator No. 1, to John S. Metcalf Co., Montreal. This will make the total capacity of this elevator 2,500,000 bushels; while elevator No. 2, recently completed by the same firm, has capacity for 2,600,000 bushels. The addition will be of reinforced concrete and steel, and will cost approximately \$700,000.

Welland, Ont.—Two wharves have been built on the canal at Welland, and arrangements are now being made to erect a large warehouse for in and out freight.

St. John, N.B.—Fire did several thousand dollars' damage on the dredge *Beaver*, employed by the Federal Government in St. John Harbor, on Feb., 12.

Port Colborne, Ont.—The Government elevator here, has had a wonderfully successful year. With a capacity of 750,000 bushels, it handled last year 12,100,000 bushels, which is the largest quantity handled by any elevator on the lakes, except the Grand Trunk elevator at Tiffin, which handled 13,680,000 bushels, but its capacity is two million bushels.

C. G. S. Estevan.—The Estevan is making splendid progress on its long trip around to Victoria, B.C. The Collingwood Shipbuilding Co. received a cable from Coronel, Chili, stating that the steamer had arrived at that port on Saturday, January 25th, and that all were well.

Parry Sound.—Appointments to the fleet of the Pittsburg S. S. Co. have been made for the ensuing season. Those which interest mariners in this section include Capt. J. F. Parke to the steamer *House*, Capt. C. J. Grant to the *Lynch*, Capt. Neil Campbell to the *Morgan Jr.*, Capt. J. Narstadt to the *Gary*, Capt. J. Gemmell to the *Houghton*, Capt. A. P. Chambers to the *Palmer*, and Capt. Allan Collins to the *Reid*.

Vancouver, B.C.—An application on behalf of creditors to wind up the Imperial Car & Drydock Co., and the appointment of a liquidator was recently made by Mr. E. J. Grant in Supreme Court chambers and assented to by Mr. Justice Clement. No opposition from the company was offered, though Mr. J. E. Bird, solicitor for Messrs. Barrett & Deane, asked for a stay until next week in order that he might see his clients. A liquidator was appointed.

SHIPBUILDING AT PORT ARTHUR.

THE plant of the Western Dry Dock is working at high pressure to conclude all contracts now on hand. Besides the construction of two steamers, the plant

has the repairing of a number of vessels admitted to the docks at the close of navigation. These include the *Turret Crown*, the *Saskatoon* and the *Acadian* of the Canadian Inter-Lake line. The *Acadian* is undergoing a general overhaul. A large number of worn-out plates have been removed from her bows, and new ones are being placed. Besides this work, the boilers and engines are being gone over.

The *Saskatoon* is undergoing similar repairs, but in addition to the placing of new steel plates in her hull, she will receive many interior improvements.

The *Turret Crown* is drawn up at the side of the boiler works. For a repair job she represents more work than any of the other vessels. Her boilers have been removed, the engines are being repaired, and new masts constructed.

The Calgarian.

The *Calgarian*, launched on the 28th of December, is rapidly nearing completion. Her engines, and boilers will be installed during February. In the general interior layout, she will be practically the same as the *Hamiltonian*. The company fully expect to have this boat ready for the opening of navigation.

The new power house of the shipyard is completed, and in operation.



WHY THE MAYFLOWER SANK.

THE report of Mr. R. A. Pringle, K.C., who investigated the *Mayflower* wreck near Barry's Bay, in which nine lives were lost on November 12th, was presented to the Minister of Marine on February 6.

The findings show gross negligence and infringement of the shipping act on the part of the vessel's owners, Hudson Brothers of Combermore, one of whom went down with the vessel. The cause of the wreck was the parting of the hull seams, due to heavy strains from the machinery. Alterations on the vessel had weakened her.

The *Mayflower* sailed for a whole season without a certificate, despite repeated warnings from R. Davis of Kingston, inspector of hulls, who had refused a certificate because there was no qualified captain. Commissioner Pringle finds that Davis should have seized the vessel, but Davis took the ground that this was the duty of the customs department.

Hudson the owner is censured for sailing without a lifeboat, for with it all on board might have been saved. The lifeboat, however, got damaged the day previous to the foundering and had as a consequence been left behind.

Commissioner Pringle recommends a special official to see that vessels not complying with the Shipping Act be not allowed to ply in Canadian waters.

MR. GEORGE HANNAH HONORED.

THE transportation men of Montreal, —both navigation and railway—paid tribute on Wednesday night, Jan. 29, to the sterling character and faithful services of Mr. Geo. Hannah who, after a career of forty-five years with the shipping companies of New York and Montreal, retired from his position as passenger traffic manager of the Allan Steamship Company on the last day of the old year. A banquet was given him in the Canada Club by fifty of his confreres, who expressed their regret at his retirement in reminiscent speeches, and in the presentation of a handsome silver tea service, the tray of which was suitably engraved. The tray was handed to Mr. Hannah by Mr. R. F. McFarlane of the White Star line who has spent thirty-seven years with the steamship companies of this port, and who is now the oldest official, in years of service, in the transportation offices of the city.

Reminiscences.

The guest of the evening was in reminiscent mood and spent most of the time occupied by his address in recalling shipping conditions of a generation ago and contrasting them with those of the present time. He had crossed the Atlantic Ocean, he said, one hundred times before he was twenty-one years of age as he had spent nearly six years at sea before he entered a shipping office. Those were the days when candles or flickering oil lamps were the only lights on board the best liners, while the vessels were either full-rigged or barque rigged, with a steam plant to aid them if necessary. Nine knots per hour was the rate of speed for the passage. He recalled the long list of captains with whom he had become acquainted during his years of service—most of whom had "crossed the bar" to see "their pilot face to face."

When he came to Montreal twenty years ago, there were only five British lines running regularly to American ports, four of those being to New York and one to Montreal. Now there were six British lines in this port alone, and a corresponding increase in every other shipping line entering the port.

Shipping Represented.

The chair was occupied by Mr. W. G. Annable of the C.P.R. Atlantic Steamship Line, while around the tables were representative of every railway and shipping line that enters the city.

Appreciation of the work and worth of Mr. Hannah was voiced by Messrs. C. T. Bell, of the Grand Trunk, W. A. Coates of the Robert Reford Company, H. F. Bradley, the newly appointed traffic manager of the Allan Line, Geo. H. Ham, C.P.R., Robt. Kerr, former pas-

senger traffic manager of the C.P.R. steamships, who had travelled from Toronto to be present, F. J. McClure, Robert Reford Co., P. V. G. Mitchell, White Star line, C. J. Smith, Richelieu-Ontario Co., Guy Tombs, C.N.R., and W. A. Wainwright, Allan line.

Mr. Hannah's Career.

Mr. Hannah was born in Glasgow, in 1846, and came to the United States to settle in New York in 1866, where he completed his education in the Brooklyn High School and Brooklyn Tabernacle College, graduating in 1868. In February, 1868, he began his long career in the steamship business as a junior clerk in the passenger department of the Inman Steamship Co., whose agent at New York was Mr. John G. Dale. Mr. Hannah filled various positions with the Inman Line, until it was sold to Messrs. Peter Wright and Sons, and became the Inman and International Steamship Co. in 1887.

His services, however, were too valuable to be dispensed with, and he was re-engaged by the new firm and placed in charge of their First Cabin Department. At the end of 1892, Mr. Hannah retired from his position after twenty-five years' consecutive service with the Inman and International Steamship Companies. Towards the end of 1892, he came to Montreal to manage the passenger department of the Allan Line. From this position he retired on December 31 last.

PORT NELSON OR FORT CHURCHILL?

WORD has been received from H. T. Hazen, the Government's harbor engineer expert, who has been surveying the harbors of Fort Churchill and Port Nelson, that he will arrive in Ottawa towards the middle of February. Chief Engineer Armstrong, of the Hudson Bay Railway, is already there. Immediately upon his arrival, Mr. Hazen will lay his report before the Minister and Chief Engineer, and upon his report will depend whether or not the Government finally selects Port Nelson as the terminus of the road. Unless Mr. Hazen has found that there are insurmountable obstacles, or that the cost of keeping the harbor in shape is too expensive, Port Nelson will be the choice on account of being much nearer the wheat fields of the West, and better grades for the lines.

As soon as Mr. Hazen's report is approved, preparations will be made to send an expedition with dredging plant and all necessary equipment to the Bay, to start work first thing in the Spring on the harbor construction.

LINE WANTED TO WEST INDIES.

THE Hon. Geo. Foster made the announcement in the House of Commons, recently, that he had for some time been devoting personal attention to the prospective conclusion of an arrangement, under which a fast and modernly-equipped shipping service would be inaugurated between Canada and the West Indies. I am telling no secrets, said Mr. Foster, when I say that Canada must make up its mind to pay well for the service. We must secure a service which in speed and modern comforts and facilities is able properly to handle passenger and freight traffic. It has been found difficult to get strong reliable firms to enter into a contract.

Dr. Pugsley asked as to the truth of the report in the New York papers that a contract had been closed with the C.P.R. for the service with a subsidy of \$400,000 per year, but Mr. Foster reiterated that he had no information to communicate at the present time

NEW SHIPYARD FOR CANADA.

THE English shipbuilding firm of Swan, Hunter and Wigham Richardson are now considering entering the Canadian shipbuilding trade, according to the statement of Clarence I. DeSola, Canadian director of the firm. For some time, said Mr. DeSola, this firm has been considering the matter, and it has now been definitely decided that if a Canadian navy is to be constructed in Canada, the great Wallsend-on-Tyne firm will tender. Already, in fact, it is understood land has been purchased by the firm in Montreal, Quebec and Halifax with the object of providing for shipyards. All classes of ships would be built, including battleships and merchantmen.

FUEL BRIQUETTING.

THE subject of fuel briquetting is dealt with in a short pamphlet recently issued by the United States Geological Survey Department of the Interior. It contains an account of the progress made in the United States in the manufacture of fuel briquettes. In 1911 there were twenty-one plants in the United States which manufactured compressed fuel, an increase of five over 1909. Four of these plants were operated only for experimental purposes. Of those which operated on a commercial basis, eight employed anthracite as the raw material, two used bituminous coal, two utilized semi-anthracite, one employed refuse from oil-gas works, one utilized peat, and three used mixed materials.

IMPROVE HARBORS AND CANALS.

ESTIMATES for the fiscal year ending March 31st, 1914, were tabled in the Dominion House on February by the Minister of Finance. These main estimates call for a total appropriation of \$179,152,183, an increase of \$9,925,815 as compared with the estimates for the current fiscal year. The sum of \$250,000 is asked for a new ice-breaker steamer for the St. Lawrence, and \$145,000 for a fisheries patrol steamer for Lake Winnipeg. Expenditures upon canals chargeable to capital include: \$500,000 for waterway improvements at French River, and \$2,000,000 for the Welland Canal construction.

General Harbor Improvements.

Ontario River and harbor improvements are to be continued where now in progress. There is also a vote of \$30,000 to acquire land for harbor purposes at Port Credit; \$50,000 for harbor improvements at Oshawa; \$15,500 for wharf extensions and repairs at Brighton; \$500,000 for harbor improvements at Toronto; \$50,000 for the construction of a shelter basin at Sarnia; \$75,000 for harbor improvements at Trenton.

The ports of Quebec and St. John, N.B., are to be liberally improved. Two million dollars are appropriated for Quebec harbor, including drydock, and St. John is granted \$2,600,000 for general harbor improvements.

The votes for harbors and rivers in Ontario include the following:

Beaverton harbor improvements, \$44,000; Belle Ewart wharf, \$8,500; Belleville, harbor improvements, \$50,000; Brockville, wharf improvements, \$18,000; Brighton, wharf extension and repairs, \$15,500; Burlington, revetment wall, etc., \$25,000; Callendar, wharf extension, \$7,000; Cobourg, reconstruction of centre pier, \$20,000; Cobourg, to repair east pier and extend breakwater, \$73,500; Collingwood, harbor improvements, \$75,000; Goderich, harbor improvements, \$200,000; Haileybury, harbor improvements, \$9,500; Hamilton, harbor improvements, \$225,000; Kempenfeldt Bay, wharf, \$10,500.

Kingston, harbor improvements, \$150,000; Leamington, repairs to wharf, \$1,400; Madawaska River, deepening channel, \$5,000; Montreal River, improvements above Latchford, \$50,000; New Liskeard, harbor improvements, \$19,500; North Bay, breakwater and repairs to wharf, \$10,000; Orillia, wharf, \$9,400; Oshawa, harbor improvements, \$50,000; Owen Sound, harbor improvements and repairs, \$27,000.

Parry Sound, Wharf, \$72,000; Pelee Island, repairs to docks, \$3,700; Picnic Island, improvements of channel, \$100,000; Port Bruce, extension of west pier, \$7,000; Port Burwell, harbor improvements, \$99,000; Port Colborne, repairs

to east breakwater, \$20,000; Port Credit, purchase of property for harbor, \$30,000; Port Hope, wharf repairs, \$4,000; Port Stanley, harbor improvements, \$132,000; Providence Bay, Manitoulin Island, extension of wharf and construction of warehouse, \$33,000.

Rainy River, improvements, \$50,000; River St. Lawrence improvement, of Canadian channel between Kingston and Brockville, \$40,000; River Thames, removal of obstructions, etc., \$3,100; Rondeau harbor, wharf extension, \$1,500; Sand Point, wharf repairs and improvements, \$1,900; Sarnia, shelter basin, \$50,000.

Sault Ste. Marie, wharf repairs, \$26,000; Sault Ste. Marie, harbor improvements, \$150,000; Sea Gull, extension to wharf, etc., \$13,500; Southampton, repairs to Chantry Island breakwater, \$4,900; Stokes Bay, repairs to wharf, \$1,500; South Lancaster, wharf repairs, \$1,500; Telegraph and Nigger Islands, dredging, \$30,000; Thornbury, harbor improvements, \$75,000; Trenton, harbor improvements, \$75,000; Whitby, harbor improvements, \$22,000; Windermere, wharf, \$2,000; Windsor, landing dock and improvements, \$77,000.

**SHIPBUILDING AT LEVIS, P.Q.**

A contract was recently awarded to T. Davie & Sons, Levis, to build six steel scows for the Department of Public Works. A big screw-hopper dredge for the Marine and Fisheries Department, is also under construction, and is nearing completion.

History of the Davie Co.

The history of the Davie firm is closely linked with the story of the shipbuilding industry in Canada. During the years of the French regime, and later, until iron vessels displaced wooden ones, the harbor of Quebec was a great shipbuilding centre, both on the Levis and Quebec side of the river. The shipyards carried on a thriving business, which reached its zenith in 1864 during the American Civil War, when more than 100 ships were built and over 5,000 ship carpenters were employed.

It was during this period of development that Mr. Geo. Taylor laid the foundation of what was later to become the shipbuilding business of Geo. T. Davie & Sons, at Orleans Island. In 1827, Mr. Taylor received a silver cup from the Government on the completion of the "Kingfisher." In 1830 the business was transferred to Levis, Mr. Allison Davie taking charge. Eventually Mr. Geo. T. Davie, his son, succeeded him under whose able management it has expanded to its present proportions.

Salvage Appliances.

At the present time their ship-yards at Levis are equipped with the most per-

fect known appliances for the salvaging and repairing of damaged vessels, and the firm owns a number of wrecking steamers. This is additional to their shipbuilding plants, the upper yard of which has a patent slip 500 feet long capable of accommodating vessels up to 5,000 tons.

It is quite evident that the picturesque old square rigger and her trim sister crafts, which have played so important a part in the development of the British Empire, are gradually disappearing, never to return. Fulton's clumsy and slow-going "Clermont," 100 feet over all, has grown in a single century to the palatial trans-oceanic liners of the present day.

Future Shipbuilding Development.

While no determined effort has been made in the direction of steel ship construction in Canada, this question is one of the active issues before Canadians at the present time. Canada's progress will force developments along this line, and, already, plans for the establishment of such shipbuilding plants are under way. Montreal as the commercial capital of the Dominion, and with her great manufacturing establishments, will necessarily participate in the development of this industry to a considerable extent.

Recently representatives of Swan & Hunter and Wigham, Richardson, Ltd., of Newcastle, and Doxford & Son, of Sunderland, looked over the possible sites for yards in Montreal. These gentlemen are naturally reticent with regard to the nature of the report that they will submit to their firms on their return, but it is understood that they are impressed with the improvements at that port due to the presence of the floating dock, and with the fact that the Canadian Vickers, Limited, contemplate the erection of a ship-repairing plant in its vicinity.

**NEW AIDS TO NAVIGATION.**

MR. A. Johnston, Deputy Minister of the Department of Marine and Fisheries of Canada, has notified President Livingstone of the Lake Carriers' Association of several changes in aids to navigation which will become effective with the opening of the lake season this year.

A steel cylindrical gas buoy will be placed to mark the north end of the shoal extending northward from Stag Island in the St. Clair River. The buoy will be moored 1,200 feet from Stag Island upper light on the west side of the St. Clair River. It will be surmounted by a pyramidal steel frame supporting the lantern, which will show

an occulting white light. The buoy will be red with black horizontal bands.

A red gas and bell buoy showing an occulting white light will replace the gas buoy in prolongation of the north-eastern edge of the dredged channel of Thunder Bay, Port Arthur. The new buoy will be of steel, surmounted by a steel frame supporting a bell and lantern.

A square, white pyramidal concrete beacon fifteen feet high will be placed on the rock awash between Mink Island and Sister Islands in Victoria Channel, Lake Superior.

Attention is called to the fact that the mast and drum surmounting the beacon pier northeastward of Jackstraw Shoal, Thousand Islands, in the St. Lawrence River, is painted black, and not red as reported in Canadian lists of lights.



PLAN TO OBSTRUCT ICEBERGS.

ARTIFICIAL obstruction of the Labrador Current, passing over the Grand Banks of Newfoundland, and a scheme to prevent the encroachment of icebergs and fogs in the North Atlantic, are the purposes of a bill introduced in the U.S. Congress, on Jan. 18, by Representative Calder, of New York. The bill proposes the creation of a board to be known as the Labrador Current and Gulf Stream Commission, to be composed of a naval officer and two other competent persons appointed by the President.

Commission Instructions.

The commission is charged with the duty of investigating and reporting as to the feasibility and cost of causing an obstruction to the Labrador Current, and to ascertain by practical experiments the best means that can be employed to create a deposit upon the Grand Banks of the sand and other sediment carried by the Labrador Current.

The commission is further instructed to report on the effects of such an obstruction:—

First—In preventing the encroachment of icebergs and fogs in the course travelled by the trans-Atlantic steamers.

Second—The effect upon the Gulf Stream and other currents.

Third—The effect upon the climate of countries in the northern hemisphere on both sides of the Atlantic.

Fourth—The probable effect upon the fogs of the coast of the United States, Canada, the British Isles, and upon the waters thereabouts.

Fifth—Any other effect of such obstruction, not specifically mentioned, which may be discovered and deemed worthy of note for scientific or other purposes.

The commission shall also make a thorough investigation of the current and sub-currents of the ocean which would be influenced by the proposed obstruction, and especially the probable effect upon the disintegration of the warm, north flowing Gulf Stream, which now occurs by its meeting the cold flowing Labrador Current.

The sum of \$100,000 is placed at the disposal of the commission, which is directed to report within two years.



MARINE MEN'S ANNUAL DINNER.

SEVERAL important announcements of Ministerial policy were made to the members of the Dominion Marine Association at their annual dinner, held at the Royal Ottawa Golf Club. Mr. Jas. Playfair, of Midland, retiring president of the association, occupied the chair. The Hon. Frank Cochrane, Minister of Railways and Canals, intimated that the lock gates of the new Welland Canal would be 30 ft. in depth, in order to provide for the development of traffic on the great lakes. The depth of the canal for the present will be the same as the American locks at the Sault, 24½ ft., but the new canal will be so constructed that at any time when the locks on both sides of the St. Mary's River are deepened to 30 ft., the new Welland Canal can be dredged to the same depth.

Steel Shipbuilding.

The Hon. J. D. Hazen, Minister of Marine, in a most pointed manner, expressed his warm sympathy with the movement to encourage steel shipbuilding in Canada. He also stated that Canada would co-operate with all organizations on the great lakes in resisting the efforts of the Chicago drainage authorities to reduce the level of the great lakes or the St. Lawrence.

Officers Elected.

The association elected the following officers: President, L. Henderson, Montreal; First Vice-President, A. E. Matthews, Toronto; Second Vice-President, H. W. Richardson, Kingston. Executive, E. E. Horsey, Kingston; S. V. McLeod, Sault Ste. Marie; J. W. Norcross, Toronto; Frank Plummer, Toronto; H. H. Gildersleeve, Sarnia; F. S. Wiley, Port Arthur, and A. A. Wright, Toronto.



Sault Ste. Marie, Ont.—The promoters of a dry dock have succeeded in financing the enterprise in England. Messrs. Pethwick Bros., Ltd., of Plymouth and London, have undertaken the work at a cost of \$1,000,000. Construction will commence April 30, 1913, and the dry dock must be completed by October 1, 1914.

A NEW BOILER SCALE REMOVER.

AN interesting method of removing scale from boilers has just been introduced to the Canadian market by the Dominion Specialties, Ltd., 44 Adelaide Street West, Toronto. The method consists in introducing into the boiler a heavy viscous fluid called Perolin. This preparation is of German origin and has long been favorably known all over Europe, where factories for its manufacture exist in nearly every country. Three years ago its manufacture was also commenced in the United States, where Perolin is said to have been wonderfully successful and widely adopted.

Strictly speaking, Perolin is not a boiler compound, since its action is entirely different to that of the usual chemical compounds. Its peculiar properties are that it does not dissolve the scale or scale-forming sediment, but, having a strong affinity for the heated metal of the boiler, separates the scale from the metal, mechanically leaving a preservative film on the water covered surface. The scale adhering to the metal is a non-conductor of heat, and being of a stony formation and non-elastic, will neither expand nor contract, and, therefore, when the metal expands, this coat of scale becomes filled with cracks extending through to the metal.

When an amount of Perolin proportionate to the heating area is injected into the boiler water, its affinity for the heated metal causes it to be drawn through the cracks in the scale into contact with the metal, where it works its way along the steel, breaking the bond of adhesion between the scale and the metal, so that the scale falls off and can be easily washed out. The preservative film thus left on the metal prevents the precipitated scale-forming sediments of the water from adhering thereto, keeping them in suspension until removed through the blow-off pipe when blowing off the boiler. On account of the compound having a higher conductivity of heat than water, this surface does not in any way hinder the transmission of heat.



PILOTAGE COMMISSION NAMED.

IN the Dominion House of Commons on January 29, in reply to a question by Mr. Seigny, the Minister of Marine and Fisheries, said that it had been agreed that the personnel of the commission shall consist of Captain Lindsay, Wreck Commissioner of the Marine and Fisheries Department, Mr. Lachance, of Quebec, president of the Corporation of Pilots, and Mr. Thomas Robb, of Montreal, treasurer of the Shipping Federation of Canada.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

F. A. McBride, of Canning, has been appointed harbor master for that port.

Mr. A P Dion has been appointed to the position of Traffic Agent of the Quebec Harbor Commission.

F. F. Pichard, of Victoria, B.C., has been appointed an inspector of hulls and equipment of steamboats at Victoria, in place of John C. Kinghorn.

Bert Mantrop, of Victoria, B.C., has been appointed an inspector of boilers and machinery of steamboats at Victoria in place of J. A. Thomson deceased.

John A. McKee, president of the Western S.S. Co., who died in November last, left an estate of \$532,958. He held 806 shares valued at \$80,600 in the Transportation Company.

John Inman Sealby, died recently, at Keswick, England, aged eighty-four. He was associated with his cousin, Thomas Henry Ismay in founding the White Star Line of steamships, and retired on the company's amalgamation with the American lines.

Capt. John Balmer Fairgrieve, of Hamilton, died on Tuesday, Jan. 29, after a long illness. He was 79 years old on Christmas day, having been born in Flamboro' in 1833. He moved to Dundas, later coming to Hamilton when about eighteen years of age. He built the first steel boat used in Canada—the Arabian. The late Capt. Fairgrieve was a commander in the Royal Mail Line.

R. O. MacKay, of the Hamilton firm of R. O. & A. B. MacKay, died at his home, recently, in his sixtieth year. He was the eldest son of the late Aeneas D. MacKay, a native of Golspie, Sutherlandshire, Scotland. The companies with which deceased was identified were the first to take advantage of the enlargement of the lower canals and of the trade on the Great Lakes. They brought out from the Old Country the

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclavia Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

steel steamers Strathcona and Donnacona, and were the first to place large vessels in the lakes to carry freight.

The death of Captain McInnes, an old and esteemed resident of Orillia, Ont., occurred on Tuesday, Jan. 14, from Bright's disease. He was 74 years of age. The late Captain McInnes was born in Glasgow, Scotland, in 1839. He came to Canada with his father, who was a shipbuilder at Greenock, Scotland, in 1854. In 1855, McInnes engaged as sailor on the schooner Queen, built by the late Mr. McPhee, of Mara. The next year he went to the upper lakes, where he made uncommon progress, and in a short time had his papers as mate and then captain. Twice during his service on lakes he was shipwrecked.

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.

President—James Playfair, Midland; **Counsel**—F. King, Kingston, Ont.

GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

Chairman—W. F. Wasley, Gravenhurst, Ont. **Secretary**—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.

President—A. A. Heard, Albany, N.Y. **Secretary**—M. R. Nelson, New York.

THE SHIPPING FEDERATION OF CANADA

President—A. A. Allan, Montreal; **Manager and Secretary**—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; **Grand Secretary-Treasurer**—Capt. H. O. Jackson, 376 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

James T. McKee, 268 Douglas Avenue, St. John, N.B., **Grand President**.
Thos. Theriault, Levis, P.Q., **Grand Vice-President**.
Nell J. Morrison, P.O. Box 238, St. John, N.B., **Grand Secretary-Treasurer**.
Jno. A. Murphy, Midland, Ont., **Grand Conductor**.
George Bourret, Sorel, P.Q., **Grand Door-keeper**.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

TO SELL LAKE STEAMSHIPS.

BY direction of the U.S. District Court, the fleet of lake steamships owned by the Gilchrist Transportation Company will be advertised for sale on March 16 at Cleveland. Bids for the ships must be submitted either for the fleet into which the boats were divided by the appraisers, or for single boats. The vessels have been ordered sold to pay receivers' certificates and to pay overdue bonds and other claims.

WILLING TO TRAIN CADETS.

THE Union Steamship Company of New Zealand are willing to accept cadets to train as officers. The training will take place on the Aparima, which is a steamer affording ample opportunities for the work. The sailing ship Dartford, formerly used for this purpose, is now converted into a hulk. The training of the cadets will include navigation, seamanship, splicing, sail-making, gear rigging, drill, swimming, etc. The offices of the company are in Vancouver, B.C.

Directory of Subordinate Councils for 1913.

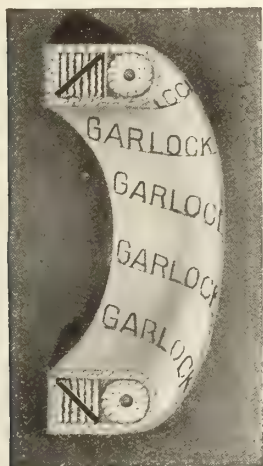
Name.	No.	President.	Address.	Secretary.	Address.
Toronto,	1	A. J. Fisher,	490 Concord Ave.	E. A. Prince,	61 Elm Grove, Toronto.
St. John,	2	J. F. Matthews,	50 Douglas Ave.,	G. T. G. Blewett,	65 Harrison St., St. John, N.B.
Collingwood,	3	Andrew Kerr,	Box 343, Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood.
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3208 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	A. S. DeGruchy,	Room 23, Williams Bldg.,	E. Read,	859 Thurlow St.
Levis,	8	Helaine Mercier,	Blenville, Levis,	Jules Lecours,	Blenville, Levis, P.Q.
Sorel,	9	Geo. Bourret,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	H. W. Fletcher,	636 4th Ave. East,	E. J. Riley,	1030 1st Ave., Owen Sound, Ont.
Windsor,	11	Alex. McDonald,	Windsor, Ont.,	Nell Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,	Midland,	Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault Ste. Marie,	14	Thos. O'Reilly,	Sault Ste Marie,	Geo. S. Biggar,	Sault Ste Marie, Ont.
Charlottetown,	15	J. K. Sutherland,	Charlottetown, P.E.I.,	Lem Winchester,	302 Fitzroy St., Charlottet'n, P.E.I.

Garlock Marine Packings

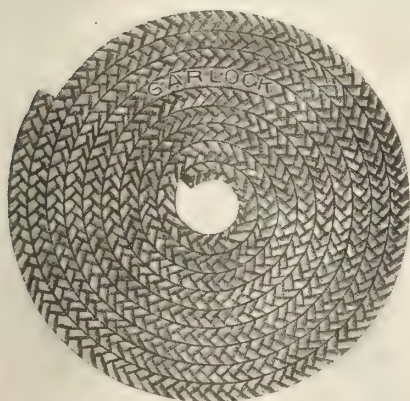
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Garlock High Pressure Diagonal



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Hamilton

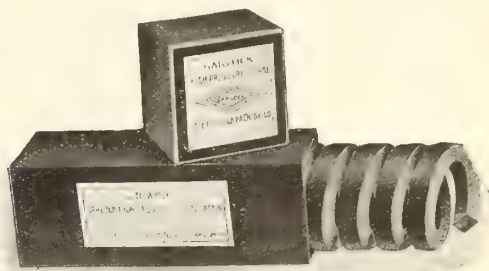


BRANCHES:

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Garlock High Pressure Spiral



Garlock Low Pressure Diagonal



Garlock Gum Gore

The advertiser would like to know where you saw his advertisement—tell him.

DANGEROUS ICEBERGS.

M. C. JANET, a French scientist, who has for some time past closely studied the movements of and changes in icebergs, has written an interesting article on the subject in the Paris "Cosmos." He explains why it is that icebergs become more and more dangerous as they flow southward and melt, up to such time as they become very small chunks of ice, when they naturally lose their dangerous qualities. The iceberg melts in such a manner that it leaves only slightly submerged great knife-like ridges of ice, which are quite a distance from the exposed portion of the berg, and which would easily rip the hull of a big vessel asunder should she plough across these submerged ridges at full speed.

Berg Features.

"The volume of the exposed part of some icebergs," writes Professor Janet, "is sometimes very considerable. As the total volume of an iceberg is at least nine times that of the part out of water, and as most icebergs have reached a more or less advanced state of fusion by the time that they are first observed, we may conclude that among the blocks given up to the sea by the fronts of certain glaciers, some must be of very great size. These blocks must have a nearly prismatic form included between two horizontal faces. In fact, the upper face is part of the free surface of the glacier, which, except for crevasses and irregularities, is sensibly plane. The lower face is also practically plane because it has been sliding over the bed of the glacier.

As for the side faces, they are the result of irregular cracks that are generally perpendicular to the upper and lower faces of the block and are consequently vertical when the iceberg floats freely. The upper and lower faces are usually of an elongated form, greater in a direction parallel to the glacier-front.

Among the extremely varied forms that such an iceberg, originally prismatic and compact, may assume under the action of the destructive causes to which it is subjected, there is one that probably presents itself frequently and which deserves our attention. The upper face of the iceberg melts slowly and pretty uniformly under the action of the air. There forms on it small ridges and small channels through which the water runs off. The exposed vertical walls also melt under the action of the air. The re-entrant parts of these walls are often less attacked than the salient parts, because they give passage to the air chilled by the melting of the upper surface. The salient parts thus tend to be smoother, and there results a certain regularity of the lateral contour.

When the water surrounding it is at

a sufficiently high temperature, the iceberg melts over its whole submerged surface. The result of the melting of the ice is to dilute the surrounding sea water and to chill it. The dilution produces a diminution, while the chilling causes an increase in the density of the water. While there is never compensation between these two contrary actions, the result of the fusion of the iceberg produces only a slight variation of the density of the sea water. The result is that the whole submerged part of the iceberg remains constantly surrounded with cold water, and thus melts uniformly and slowly.

This, however, is the case only with the lower surface and the parts of the side walls that are quite deeply sunk. The parts just below the surface undergo usually a more intense fusion than the rest. This results from a more rapid renewal of the chilled water, produced by the agitation due to waves and to surface currents. In this case a sort of circular gorge is melted out around the berg, immediately below the surface of the sea, and the result is an excess of weight in the parts subjected only to aerial meltings. These, being ill-supported, shortly sink lower. At this stage, the berg seems to reach out under the sea and rip open the hull of a ship as with a rapier. Simple friction against the submerged part of such an iceberg may, almost without shock, produce long tears in the relatively thin hulls of large vessels."

SHIPBUILDERS WANT SUBSIDY.

REPRESENTATIVES of all the leading shipbuilding companies throughout the Dominion, waited upon the Right Hon. R. L. Borden recently, and described the keen competition which they had to meet. It was declared that unless assistance from the Federal Government was received they would be forced to abandon the struggle.

One of the spokesmen suggested the imposition of a duty on British ships, another thought such a plan would not prevent British ships from engaging in the coastwise trade, and proposed the payment of a bonus per net ton on ships built in Canada, and a subsidy on the cost of construction to the extent of about 20 per cent.

Premier's Promise.

The Premier promised due consideration when provided with a detailed statement by the shipbuilders. He was anxious to know for what period it would be necessary to aid the industry in order to ensure its continuance, adding that he had been told by a British builder that wages in Britain and in Canada tended to approximate in 10 or 15 years. The construction in Can-

ada of vessels required by the Government might assist the companies of the Dominion.

Major Currie, M.P., introduced the deputation, which included Captain McDougall and Sandford Lindsay, president and secretary, respectively, of the Collingwood Shipbuilding Co.; John B. Miller, president of the Polson Ironworks, Toronto; Messrs. Black and Conn, representing the Pickford and Black Co., of Halifax; H. Bullen, president of the Esquimalt and Vancouver Marine and Dry Dock Co.; Geo. D. Davie, of Levis; S. Dymont and W. J. Fair, of the Kingston Dry Dock and Shipbuilding Co.

Torontonians' Testimony.

Mr. Miller, of the Polson Ironworks, said that at present the Canadian companies on the lakes had to confine themselves to ships which could not be built in Britain and sent through the St. Lawrence canals. On a vessel costing \$120,000, the Canadian companies were taxed about \$12,000 in duties on fittings and other "raw materials."



OIL ENGINE PROPELLED FISHING SCHOONER.

WITH a full load of provisions, ice, and a crew of seventeen men, the Gertrude De Costa, the new 114-ton modified knockabout type of schooner, owned by L. J. & M. Costa, Boston, left T Wharf on December 23rd for the fishing grounds off the Nova Scotia coast. The sailing is of significance in that the



LAUNCH OF OIL ENGINED FISHING SCHOONER.

boat is equipped with a 3-cylinder 70 h.-p. Blanchard oil engine, operating on fuel oil, which cost 53¢ a gallon. The Gertrude De Costa is a new boat, and was built at the yards of Tarr & James, Essex, in accordance with the design of Thomas F. McManus, who has designed over 300 fishing schooners. Lying alongside T Wharf, it made a striking contrast to the other nearby fishing vessels, being the only one without a bowsprit.

The vessel has deep and sharp hull lines and a short sail base, making it safe and easy to handle in rough water. It has plain pole masts, without top-

masts, and the sail area is less than one-half that with which boats of this size are normally equipped. Eight hundred gallons of fuel oil were taken on this trip, and the same was purchased at 5¼¢ a gallon, while gasoline in 500-gallon lots could not be purchased for less than 19¢ per gallon. Captain John Shea, of the Gertrude De Costa, is keeping an accurate record of the amount of oil used, and this, together with other data on the engine during the trip, will be awaited with much interest.



CAR FERRY CONTRACT.

ACCORDING to an answer given in the House of Commons at Ottawa, recently, the contract for the new car

ferry steamer between Prince Edward Island and the mainland has been awarded to Sir W. G. Armstrong, Whitworth & Co., Newcastle-on-Tyne, for £138,000. The car-ferry service will begin some time during next year. There were four tenders received for the construction of the steamer. Canadian Vickers, Limited, of London, Eng., submitted two tenders, one for £110,000, and one for £112,480, but though much the lowest, they were not accepted.



C.P.R. AND THE MEDITERRANEAN.

IN view of the great amount of interest caused in shipping circles by the announcement that the Canadian Pacific Railway Co. are about to institute a line

of steamers from Canada to the Mediterranean, it is of value to see the reception given to such a proposal by the people in the Mediterranean ports. Dealing with this subject the Antwerp paper "La Metropole" draws attention to the words of Dr. Riedl, Under Secretary to the Austrian Minister of Commerce. Speaking in the Social Political Committee of the Lower Chamber of the Reichsrat, the doctor said that the port of Trieste would do nothing but profit by the C.P.R.'s overture to open a line between Trieste and Canada. The interests of their society were just the same as those of the State—above everything else to counteract the formation of an Atlantic shipping pool.

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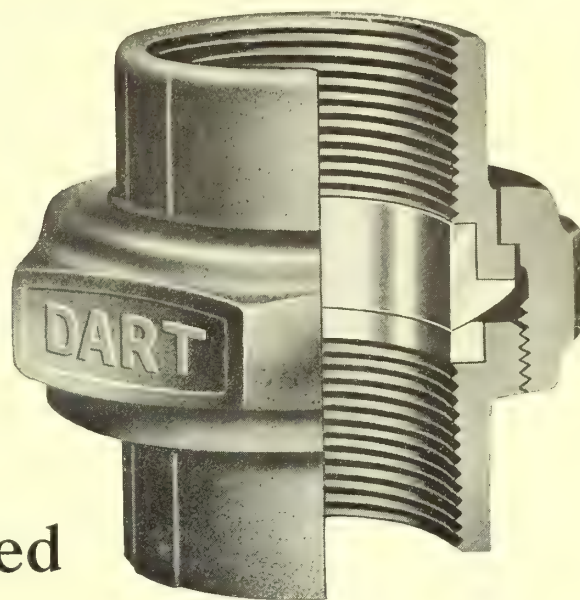
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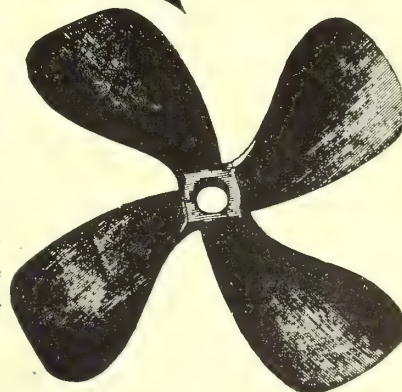
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No. 3

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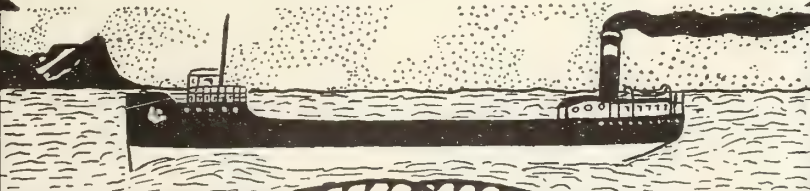
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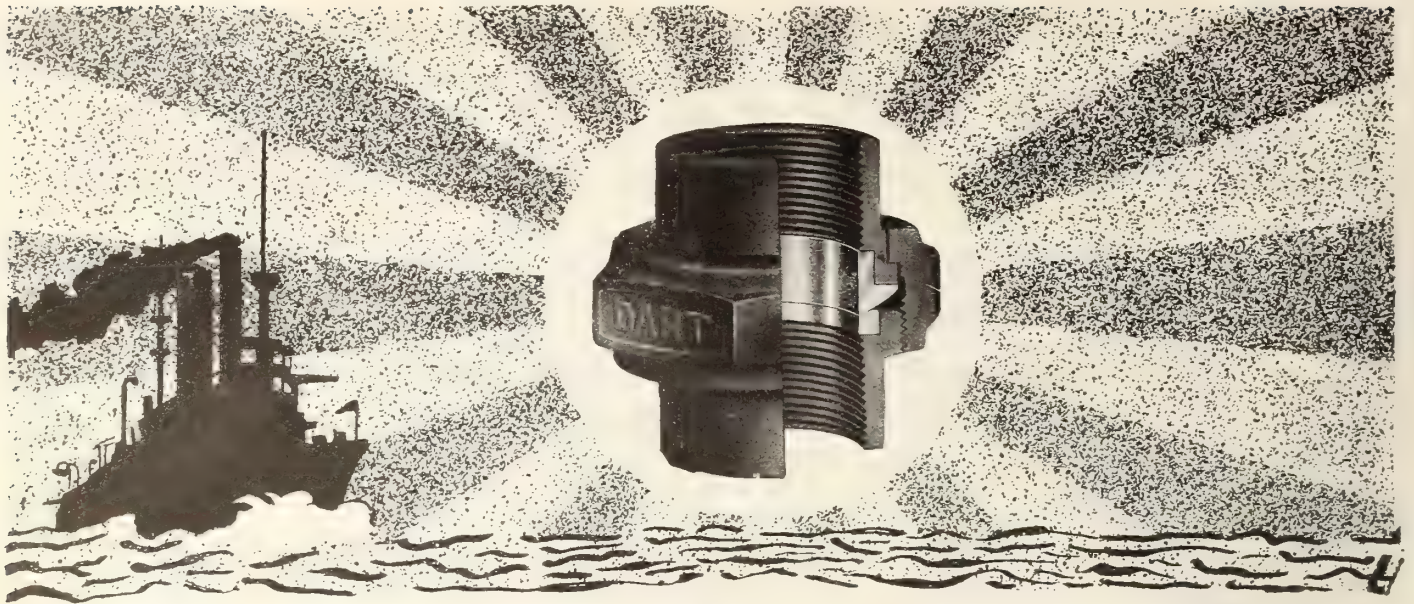
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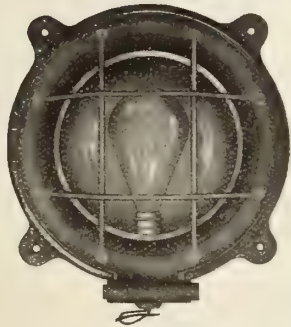
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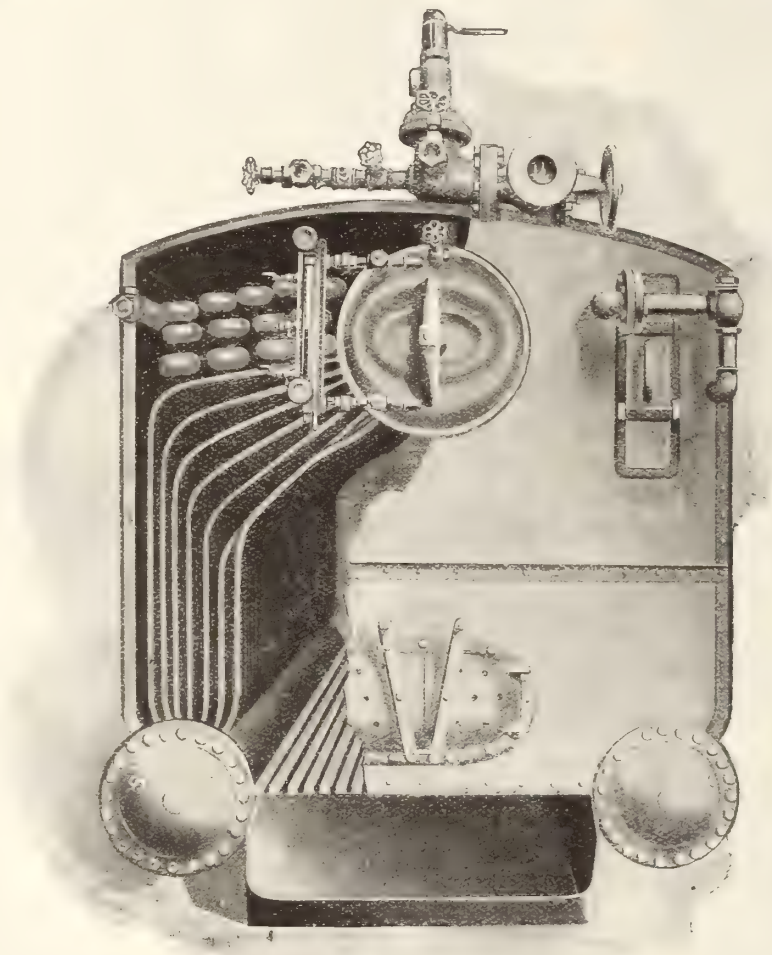
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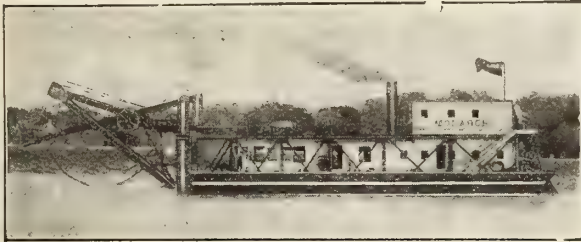
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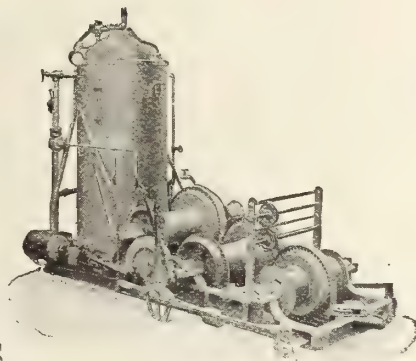
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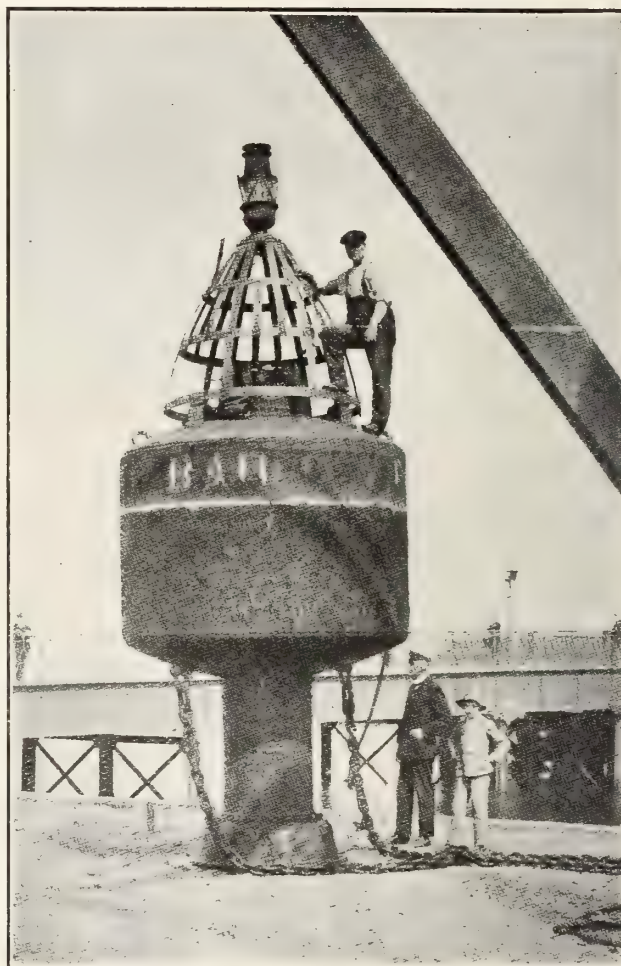
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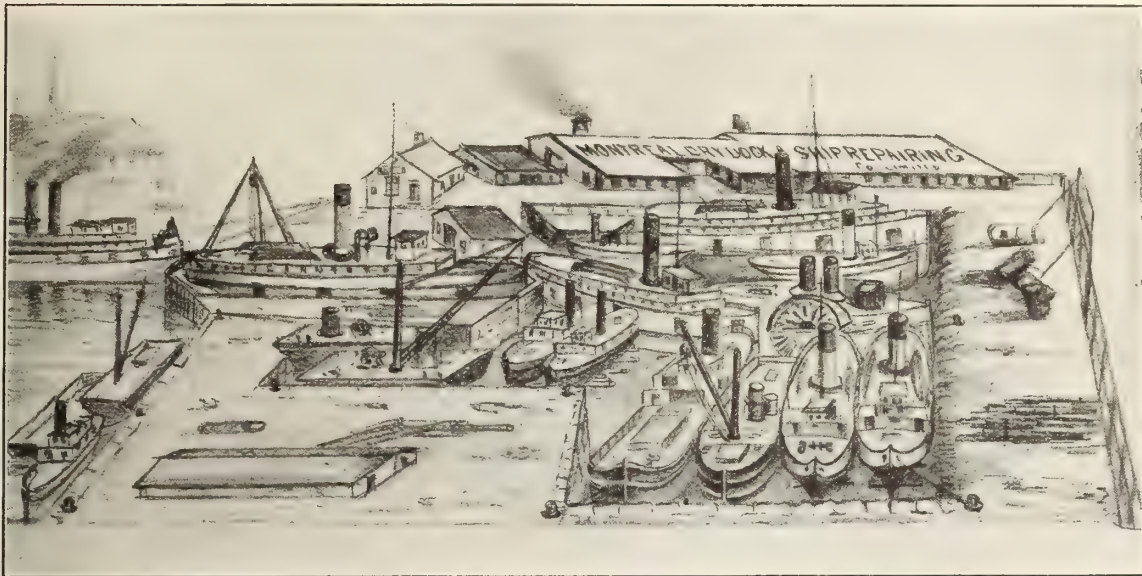
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The advertiser would like to know where you saw his advertisement—tell him.

The Achievement of the "Allans" in the Domain of Shipping

By Linton Eccles

In this Article, the story of the Master Navigators of the River St. Lawrence is told, giving, in More or Less Detail, Particulars of the Coming of the "Allans" to Canada and of the Large Success Attending Their Efforts in Building up a World-Known Steamship Business.

FORGET the traditional closeness of the Scot—which is well within the range of controversial topics—and try to associate with him as a race, a more abiding, a more distinctive quality. Wouldn't you say, after a brief moment's consideration, that it is his tenacity of purpose? Well, Canada, not to say the world, ought to know something about that.

Somebody—it doesn't matter much who—once illustrated the national trait by a little story.

"And is that your grandfather, Sandy?" asked the inquisitive visitor. He had picked out an old photograph—you know those quaint relics of early developing days printed on sensitized glass.

"Aye," said Sandy, "it is."

"What was your grandfather, Sandy?"

"A stonemason."

"And this"—coming to another photograph, not on glass this one—"this is your father, eh? What was he?"

"He was a stonemason," said Sandy's father's son.

"And what are you, Sandy?"

"I'm a stonemason, too," was the answer.

Sandy's eldest was busy in a corner of the room over his home lessons, and

"Jamie!" said Jamie's father. "Oh, I think we'll mak' a stonemason o' him as weel."

Put the family name down as Allan, and change the business from one of



SIR HUGH ALLAN.

handling stones to one of handling ships, and you have the history in little of the Allans.

Hugh Allan.

Sir Hugh Allan, the father of the Canadian branch of the family, was still new to his knighthood, bestowed on him by Queen Victoria, when he had passed his three score of years and could well leave much of the handling of his ships to the next generation of Allans, and almost to a boy, they were started in their apprenticeship whilst they were young enough to begin at the bottom. That is one practical side to the Scot's tenacity that most of us well might copy.

I should have enjoyed sharpening my cub-reportorial wits in what I am sure would have been a one-sided contest in getting old Sir Hugh to talk, as we call it in newspaper offices. Imagine pumping him for his opinion upon the Montreal harbor of to-day, or just yesterday, with his mind's eye on the Montreal harbor that wasn't when he landed at the national port on that spring Sunday morning in 1826! I had to get my pen-picture of Sir Hugh at second hand.

"He was just a typical dour, practical Scot, with a single eye to business

and getting it by direct, matter-of-fact methods," so declared the old Montreal journalist whom I button-holed on the subject. His summing-up was not very promising, but, grubbing after the facts in one hiding-place and another, I began to get a glimpse and then a clearer vision of a more romantic figure than that. A man who had been sent out into the world at the age of fifteen by his hard-headed father, and sent to the Canada of eighty-six years ago, to become the founder of the real navigation of the St. Lawrence—such a man must have been a personality indeed.

When you go into his career, you will find the right stuff of which romance is made. Adventures? Well, listen to this outline of his settling in Canada.

Settlement in Canada.

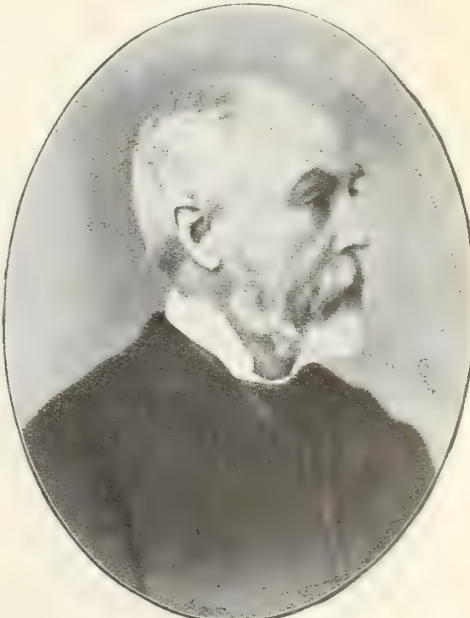
Captain Alexander Allan, who piloted playthings of ships across the Atlantic a century or so ago, knew what he was doing when he turned young Hugh adrift on April 12, 1826. On that day the boy sailed from Greenock to make his fortune. The ship, the brig Favorite, was in command of his father, and his eldest brother was second officer. She reached Quebec on May 15, and was towed up



SIR H. MONTAGUE ALLAN.

the visitor noted him with quiet approval.

"And what's Jamie going to be, Sandy?" he asked.



ANDREW ALLAN.

the river by the steamboat Hercules—these shipbuilders always have had a fancy for pretentious names—then the only towboat on the St. Lawrence. They

reached the foot of St. Mary's current, but against the stream and the strong breeze the little steamer could do no more.

There was nothing new in that to the captain of those days, for it was as much as a steam-propelled boat could do to puff itself along an inland waterway. A hawser was passed ashore from the brig, and the rest of the towing of the Favorite was done by a team of twelve pairs of oxen. By this means Hugh was able to land at Montreal early on Sunday, May 21, 1826. At that time the port of Montreal was something of a joke—it must have been even to the stalwarts of those early days. There was no such thing as a wharf, and ships making Montreal had to edge in as near to the beach as they could get. Then the seamen waited for a favorable moment, rigged a long plank on spars, and, if they were lucky, the passengers and crew got ashore dry.

Here, in the Montreal of that time, Hugh Allan was left by his father and brother to find the road to fortune. His first job was that of junior clerk in the dry goods house of William Kerr & Co., St. Paul Street, and he stuck at it for three years. At that period there was not much doing or done in the city during the winter months. Hugh, helped by his pocket money and the friendship of his father's acquaintances, spent them generally at Ste. Rose and Ste. Therese, and if he did nothing else useful he learned to speak French well enough to make capital of it afterwards.

Hugh Visits New York.

At the age of nineteen, we read of him starting out to learn a little more

face towards New York—before, mind you, there was such a thing as a railway. He spent some time in the Mecca Americana, and then boarded a boat for Al-



BRYCE J. ALLAN.

bany. From Albany he went by boat again up the Erie Canal as far as Rochester, where he commenced a series of coach stages, to Buffalo, Niagara Falls, Hamilton (then a sleepy village with a mere handful of homes), and to Toronto (a little bigger and rather less sleepy village), and so to Kingston. At Kingston he boarded another boat to Prescott, where as there was no running the rapids in those days he landed and finished his way to Montreal by stage coach again. The trip to New York and back filled a little more than two months.

Home Again to Scotland.

After this strenuous enough jaunt you would have thought that young Hugh was ready for a rest; but in less than a week he was off to Quebec to join his father's ship. As it happened, the Favorite, along with a number of other vessels, was delayed for a month by contrary weather, and it was not until November 21 that the fleet could sail. The Favorite was deeply laden with wheat—a pioneer ship down to her cargo, you see—from the farms of Ontario and Quebec, and the boisterous trip to Greenock occupied five weeks, the four Allans on board, Captain Alexander and three of his sons, arriving home appropriately in time for New Year's Eve.

Visit to London.

Hugh Allan stayed at home for three months, and then was off sight-seeing again, his objective this time being Liverpool and London. It is interesting to recall that he travelled from the Mersey

port to Cottonopolis over one of the earliest railway lines, the Manchester and Liverpool, then recently opened. Hugh, anyway, by that time was used to taking his life in his hands, so that one additional risk, and this on land, would hardly cause him much anxiety. From Manchester to London was a lengthy stage coach journey. Young Allan doubtless saw as much of the capital as he could in a short time, and was ready on April 1, 1831, to leave again for Canada.

Sails Again for Canada.

He sailed in the ship Canada, which was making her maiden trip. He landed in Montreal, and this time he had come prepared to settle down to the serious business of life. He entered the shipping house of James Millar & Co., and at the end of 1835 he was taken into partnership with Mr. Millar and Mr. Edmonstone, the members of the firm. Mr. Millar died three years later, and the two junior partners carried on the business. Hugh, just before this, had managed to cram in a few more adventures off the humdrum line of business, serving as volunteer in the two rebellions of 1837 and 1838, in the latter of which he was given the rank of captain. In 1839 he was joined in Montreal by his brother Andrew, twelve years younger than Hugh and then in his seventeenth year.

Another Atlantic Voyage.

That same year Hugh Allan had the most adventurous of his frequent voyages across the Atlantic. In company with the Hon. Joseph Masson, Mr. G. B.



HUGH A. ALLAN.

of the North American continent than he could pick up in and around Montreal. In August of 1830 he turned his



ANDREW A. ALLAN.

Symes, of Quebec, and other Canadians, he embarked at New York on Dec. 14 in the steamship Liverpool. This was in

the early days of transatlantic steam navigation, and before the foundation of the Cunard line. The Liverpool ran into heavy gales, and on the 28th of the month, when little more than halfway across, the chief engineer reported that they had not sufficient coal to carry them to Liverpool, and the steward added the information that, anyway, the provisions would not last out. It was determined, therefore, to run to the Azores, and on the last few shovelful of coal they reached the island of Fayal on New Year's Eve.

The Liverpool was the first steamship the people of the islands had seen, and the sensation can be imagined. The fourteen passengers were landed, and the Portuguese governor, with the American and British consuls, got up a ball for the occasion. During their stay of four days at the islands, Hugh Allan and Mr. Symes took a day off to climb the highest mountain, Caldera, an extinct volcano seven thousand feet above sea level. in

paying basis undoubtedly were great, and after a year and a half the British firm gave up the job in despair. Hugh and Andrew Allan, however, were still convinced of its practicability, and, through the influence of the Hon. John Ross, Hon. George Etienne Cartier, Hon. L. T. Drummond, and others, they were told to go ahead and see what they could make of it.

The Montreal Ocean Steamship Co.

Andrew Allan, by this time, was an active member of the firm, which then was known as the Montreal Ocean Steamship Company. Already they had got built the steamers Canadian and Indian.

These vessels, built by William Denny, of Dumbarton, were not quite as big as the Cunarders of that day, but they were a little faster, the Allan boats steaming eleven knots against the Cunarders ten and a half. They were built of iron, and had screw propellers.



ALLAN LINE STEAMSHIP "VIRGINIAN."

the Azores. Thirty days after leaving New York, Allan turned up at Liverpool to explain to his friends that he had not been drowned.

Return to Montreal.

The following spring he was again in Montreal with plans for the extension of the firm's business. The then Governor-General, Lord Sydenham, ordered from them a steam frigate, which was called after him. Edmonstone and Allan also built for the government the small steamer Union. Following this they launched the Alliance, which remained for years one of the most powerful tugs on the St. Lawrence.

With the era of the screw steamer about 1851, Hugh Allan, his partner, and his associates, who were prominent business men of Montreal, Quebec and Kingston, besides Scottish members of the Allan family, opened negotiations with the government for establishing a regular steamship service between Britain and the St. Lawrence. The government preferred, however, to give the contract to a firm in Britain. The handicaps against keeping the service going on a

They were not entirely dependent upon steam, however, being rigged to sail under canvas as capably as any regular wind-jammer. The service by the Canadian and Indian was interrupted at the outbreak of the Crimean War, when they were chartered by the British Government to convey troops to the Black Sea.

As soon as the matter of the Canadian Government contract was settled, Hugh Allan crossed to England and made arrangements for the building of two more steamers, the North American and the Anglo-Saxon, and in the spring of 1856 was commenced a regular fortnightly service to and from the St. Lawrence during open navigation, and monthly to and from Portland during the winter months. The Grand Trunk Railway about that time had extended its line to the Maine port. In 1857 the Allans agreed with the Canadian Government to maintain a weekly service the whole year through, the subsidy being increased accordingly. This involved the building of four more and

larger steamers, which were put in commission in May, 1859.

The First Allan Ship.

Samuel Cunard, founder of the Cunard Line, and sharer with Hugh and Andrew Allan of the distinction of being pioneer steam navigators of the St. Lawrence, was, by the way, a Canadian by birth. The Cunard concern was a few years ahead of the Allans with its steamers, but the Allan connection with Montreal shipping goes back farther by reason of their earlier activities with sailing vessels.

There is in the possession of the Mr. Andrew Allan of this generation, I believe, or at any rate in the possession of the Allan family, an original painting of the brig Jean, the first Allan ship to cross the Atlantic. A model of the Jean is also to be seen in the Windsor Hotel, Montreal. She was a vessel of 179 tons register, and made her maiden trip from Glasgow in May, 1819. She was commanded and owned by Captain Alexander Allan, and his sons, Bryce and James, were respectively first and second mate of her. The family belonged to Ardrossan, a seaport on the Clyde about forty miles from Glasgow. Within eight years after the starting of the Jean on the St. Lawrence route, the Allans had four clipper packets running to Canada—a fine instance of that tenacity of purpose of which mention was made at the beginning of this article. The old captain stuck to his bridge until 1831, when he gave up active command to look after the growing business of the shipping office in Glasgow.

Captain Bryce Allan.

In September, 1839, twenty years after the coming of the old Jean, appeared an advertisement in a Montreal newspaper which informed the public of the sailing "For Greenock, Scotland, of the well-known coppered ship Canada, 329 tons register, commanded by Captain Bryce Allan; for passage, apply to Capt. Allan on board." Capt. Bryce Allan kept up the tradition established by his father of commanding his own deck, and it was not until twenty years after, when he became managing owner of the line at Liverpool, that he gave up this practical side of ownership. He died in 1883, and was succeeded in charge at Liverpool by his two nephews, Robert and James. When Captain Alexander Allan left the bridge in 1831 the Allan fleet consisted of the Canada, Favorite, Brilliant, Blonde, Pericles, Gipsy, and one or two smaller sailing ships. At the time that his son Bryce retired from active command, about 1850, the fleet not only consisted of much larger ships, but the era of steam had come.

The Era of Steam.

As Captain Alexander Allan and his eldest son Bryce will be always associated with the establishment and perfecting of the sailing packet service between Britain and the St. Lawrence, so the second and fourth sons, Hugh and Andrew, of the old seadog, will be famed among Canadian pioneers because of what they did in developing steam navigation. With Bryce in Liverpool, and their two younger brothers, James and Alexander, in Glasgow, Hugh and Andrew built up the shipping business of the firm and kept it apace with the times. It was the same tenacity of the old man, you see, coming out in his five boys. And the quality lasted with the five for forty years, when death began to make breaks in their ranks. Andrew, the last of the five, died within the past twelve years at Montreal. On the death of Sir Hugh, in 1882, Andrew Allan had become president of the Allan Line as well as of the Merchants' Bank of Canada, the Montreal Telegraph Company, and other concerns. For some years also he had been chairman of the Board of Harbor Commissioners.

Andrew Allan.

The tenacity of the Allans still lasted. The sons of those sons had been brought up to the shipping trade, and they continued the business at the old stand, or stands, for there were by this time numerous ends to the Allan interests. So far as Canada was concerned, the Allan Line consisted of Hugh and Andrew, sons of Andrew, and Hugh Montagu and Bryce J., sons of Sir Hugh. Mr. Andrew Allan is now the manager of the line at Montreal, and there is also a great-grandson of Captain Alexander Allan in the offices there. Mr. Hugh Allan is manager of the line in London, and Mr. Bryce J. Allan for some years has acted for the firm at Boston.

Sir Hugh Montagu Allan.

Sir Hugh Montagu Allan, as newspaper readers recently learnt, has retired from the shipping concern to look after the interests of the Merchants' Bank—which his father, Sir Hugh, and his uncle Andrew founded—along with his numerous other financial undertakings.

It has been stated, with some show of authority, that the retirement of Sir Montagu Allan from the firm of H. and A. Allan synchronized with its practical absorption by that amazing, tentacle-extending corporation, the Canadian Pacific Railway. Whether that has been compassed, is outside the scope of this article to discuss; but whilst undoubtedly the Allan Line is not to-day perhaps hardly could have remained—

the family affair it was twenty, even ten years ago, for the present at least the old name remains to remind us of the ground broken and the rough seas ploughed by the hardy introducer of the Allan name to Canada. Captain Alexander Allan's work of nearly a century ago, continued so well by the sons he brought up to his trade, will live as a Canadian monument to the national tenacity of the Scot.



TO DISSOLVE BIG TOWING CO.

THE announcement was made on February 11 that a decree had been handed down by the United States Circuit Court at Cincinnati, ordering the dissolution of the Great Lakes Towing Co., which has had a monopoly of the towing business of fourteen principal ports of the great lakes for thirteen years. The decree denounces the methods of the company, deciding that in driving out of business the numerous independent tug companies which were in active competition prior to 1899, when the company was formed, it directly violated the Sherman anti-trust law.



G.T.R. ATLANTIC COASTERS.

A DESPATCH from Providence, R.I., states that the launching has taken place of the Narragansett, the first of the Grand Trunk boats for Atlantic coastwise trade, from the shops of Harlan & Hollingsworth, Wilmington, Del. The Manhattan, a sister ship, will be launched later. Both have been designed by Mr. Kirby, of New York and Detroit, a well-known marine architect, who has designed some of the largest steamers on the Great Lakes. These vessels have been built for the Central Vermont Transportation Co., and were financed a year ago by the sale of \$1,500,000 bonds.

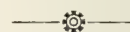
The Narragansett is a steel twin screw vessel, 336 feet long and 63 ft beam at the guards. She has six decks, three above and two below the main deck. There is accommodation for 700 first-class passengers and 500 tons of express freight. Her gross tonnage is 5,000 and her speed 20 knots.

The first-class dining room, 72 by 42 feet, is on the main deck aft, with two private dining rooms opening off it. There is also a music room and grill room on the gallery deck. Five gangways on each side of the main deck separate the different classes of passengers and freight. Spacious quarters for the junior officers and crew are on the lower decks. The Narragansett and Manhattan will ply between Providence and New York.

OUTLOOK FOR 1913 SHIPPING.

AGENTS of the different ocean lines operating out of Canadian and American ports predict that this year's travel will be the largest in the history of all the lines. The number of bookings and reservations made by tourists is more than double that for the same period last year. This condition of affairs also applies to travel from the other side of the Atlantic.

It is stated that the booking for second and third-class travel from different European points promises to exceed that of any former year. Accommodation is fully booked for sailings extending almost into the fall, something quite unusual at this season of the year. So great has been the demand for reservations, several of the lines are endeavoring to charter extra steamers to meet the requirements.



ANALYSIS OF SYDNEY SHIPPING.

DURING the year 1912, some 125 or 150 different steamers entered the port of Sydney N.S., either with passengers and freight, or to load or take bunker. It is safe to say that at least half of these made on an average of from 10 to 15 trips here during the season, thus adding greatly to the total shipping tonnage of the port. Of these boats over thirty comprise the coal company's fleet, while the steel company have also a number on charter. Among the other lines which are represented among the 150 steamers spoken of above are the Elder-Dempster Line, the Head Line, Black Diamond Line, Reid Nfld. Co., Furness Withy Co., Mile Transportation Co., etc., etc.

The tonnage of these steamers reaches from 100 ton (the trawlers) to close upon 4,000 tons. The greater number of the steamers calling at this port during 1912, were British owned. Canadian boats calling at Sydney during 1912, were second, and Norwegian third. Their classification is roughly as follows:—

British	62
Canadian	24
Norwegian	15
Danish	8
Newfoundland	7
Dutch	6
French	2
German	1
Swedish	1
Austrian	2



Sarnia, Ont.—The Reid Wrecking Co. has not been purchased by the Great Lakes Towing Co., as reported.

The St. Lawrence River Pilotage Investigation

The commission appointed by the Dominion Government to investigate pilotage conditions as they presently exist on the St. Lawrence, has concluded its sittings, and the accompanying data contain a condensed account of the proceedings at Quebec.

THE commission inquiring into the pilotage system on the St. Lawrence River between Father Point and Montreal resumed their investigation at Quebec Court House, February 21.

The first witness called was Mr. P. H. Lamontagne, secretary of the Quebec Corporation of Pilots. He said that he had held his present position since April last, but had been assistant secretary since 1896. He promised that he would bring all the documents and statutes before the commission as soon as possible.

Had Been a Pilot.

Joseph Gravel, aged 87, who is a retired pilot, was next called, and stated that he had been a pilot for 49 years, and had retired when he was seventy-eight years old. He had served nine years of apprenticeship. Before the pilots were incorporated, their occupation was real slavery, and they were very badly treated.

Commissioner Lachance—"Although you are eighty-seven years old, your nerves are still strong."

Witness—"I am not nervous."

Commissioner—"Do you think that French-Canadians are nervous?"

Witness—"French-Canadians are not more nervous than any others."

It was shortly after this that the aged witness digressed to inform the commission that some people thought that French-Canadian pilots were no good, but he knew they were just as good as English pilots.

Mr Hodden thought that the old gentleman's remarks should not be entered as he considered that he was defending himself against imaginary attacks which had not been made or thought of by anybody present.

J. B. Briener, vice-president of the Quebec Corporation, said that he had been a pilot for thirty-one years. He considered that the system of transferring pilots at Father Point was very satisfactory. The station was better there than at Bic. He thought that the transferring of pilots by the steamer Eureka was an improvement on the small boats.

Pilot Boat Crews.

Capt. J. B. Belanger, of the steamer Eureka, was next called and said that he sometime, had trouble going alongside vessels in heavy gales, but he had never missed. He considered that the Eureka was a suitable boat for the ser-

vice in fine weather, but he would prefer a good strong steam launch.

He said that there were lifeboats on the Eureka, but the crew could not man them for they were only farm hands engaged from the surrounding parishes. They were not competent men, but came to him saying that they had been sent by their parliamentary representative. Those men only remained for about a month and then skipped out. He was powerless to prevent them, for they jumped up on the wharf and ran away. Good able seamen were badly required for the work.

Influence of Politics.

Alfred Larochelle, pilot, aged 64 years said he was appointed superintendent in 1907, and never had any trouble while in office. He did not resign, politics had put him out; he had to go. Father Point was the proper place for the station, being superior to Bic, which was dangerous during fog. He was glad he was soon going to retire on account of the way they were being treated, but he would not say by whom. They had been promised there were to be no more suspensions, but when pilots committed an offence they would find such promise was not kept.

To deprive a man of his means of living in middle life was a most severe punishment. Navigating steamers in thicker weather than this an another occasion. See, it is clearing up now," "Keep on, I can see such a light, or hear such a fog alarm. You ran in thicker weather than this on other occasions. See, it is clearing up now," If an accident occurred in the meantime, they would say: "I told you to stop," and make a report to that effect, being supported by the officer on the watch, against the pilot.

Mr. Allan Testifies.

Mr. Andrew Allan, President of the Shipping Federation gave evidence on Feb. 24. He said he considered the pilotage system of the St Lawrence was defective and, until it was put on a better basis, the insurance rates, an important matter in the interests of commerce, would not be reduced. He would have open competition for pilotage, and require pilots to speak English only, although knowing other languages would be no drawback.

Apprentice pilots should have five years' service at sea to learn discipline, a very useful accomplishment on board ship, and which all Canadians needed.

If a man under present conditions from Nova Scotia or Ontario wished to become a pilot he was unable to do so on account of his lack of knowledge of French. He thought that between Quebec and Father Point, pilots ought to have masters' or mates' certificates, and that the pooling of pilots' earnings should be abolished, and each man paid what he earned. He thought the Government could protect the pilot and see that he received all that he earned. There was no reason why a pilot should not be paid for his work immediately it was finished.

Mr. Rivard, K.C., appearing for Pilots Corporation—"Did you ever know of a pilot being refused on account of his nationality?"

Mr. Allan—"What do you mean by nationality?"

Mr. Rivard—"French, English, German, etc."

Mr. Allan—"I know of no French or English pilots."

He stated afterwards that he never knew of any pilots having been refused because he spoke one language or another.

Mr. Allan said that he considered the most essential knowledge which a pilot required was a knowledge of local conditions such as tides, currents, temperature, etc. He would place the age limit at 65 years, with a yearly examination as to physical fitness, eyesight and the like.

Age Limit and Language.

At the afternoon sitting, Mr. Raymond Bequet, sixty-eight years of age, pilot for forty-four years, and president of the Quebec Corporation of Pilots, was heard. Asked as to the age of retirement, Mr. Bequet said that he thought that seventy was right. As far as he was personally concerned he thought that it should be 75. Mr. Bequet complained of schooners which were continually in the ships' channel, and without lights. The lightship at La Travers, he thought, should be changed for a larger ship, as it went adrift several times last season. As far as pilots knowing both languages was concerned, he thought that since they had to learn English, it was not too hard on Englishmen to ask them to learn French to become pilots.

Examined Documents.

On February 25, the Pilotage Commission visited the office of Mr. Joseph Talbot, Government Superintendent of the Quebec Corporation of Pilots, to examine the files and documents there.

The first witness on this day, was Captain Belanger, of the steamer Eureka, who was recalled. He testified as to the difficulty which he had with the farm hands whom he was obliged to employ as seamen. One man only remain-

MARINE ENGINEERING OF CANADA

ed one day, and another never went on board the steamer, but remained on the wharf. He had received his orders re the hiring of men from the local Marine Department.

A number of apprentice pilots were examined. Besides giving details of the work they were called on to perform, they made a number of suggestions with regard to what would assist them in their work, such as a steamer to carry them up and down the river to learn the currents, etc. One suggested that a small sailing vessel be used to visit Riviere-du-Loup, Murray Bay, Riviere Ouelle, Saguenay, etc., to enable them to learn about these places, which they now have a rare chance of doing.

Got \$1,680, Earned More.

G. A. St. Laurent, pilot of the White Star Dominion Line, said he received \$1,680 for his service last season, but he earned more. He was satisfied with what he received, and was willing to share his earnings with his colleagues. He was paid by his company \$500 each season for expenses, which is in addition to what he gets from the Corporation. He gets only the regular dividend from the Corporation. If the Corporation were dissolved, he was afraid he might not make as much as now. He might lose his position in the steamship company.

Doing Away With Pooling.

At the sitting of the Commission on February 27, Mr. J. R. McIsaac, of the Dominion Coal Company, expressed the opinion that it would be better for the pilots to be controlled by the Government, and also that each pilot should be entitled to his own earnings instead of having them pooled, and only receiving his portion.

Explaining his reason for wanting the pooling done away with, Mr. McIsaac said that it accounted for pilots stopping work after they had made a regular number of trips, and the result of this was that a company having the same pilot for the season had to take an inferior man or else pay the regular man a bonus to continue until the close of navigation.

The next witness was Captain Holmes, of the steamer Wabana, who said that he often had to stop his ship due to tows of barges which blocked the channel. He thought that the length of such tows should be limited to 350 feet. He offered various suggestions as to lights, among others, the strengthening of the St. Laurent and the Traverse lights.

Mr. Baillargeon, pilot for the White Star Dominion Line, testified that his dividend from the Corporation was \$1,680. Besides this he had received \$12 a trip and had made 41 trips. He was satisfied as he received his share of what came into the pilots' office. The first years he worked as a pilot he re-

ceived less than \$500 as his dividend. He did not know that the corporation had received \$3,577.60 for his services last year, and while he had received less than \$1,700 he was satisfied, as he had benefited by the system thirty years ago, and would be glad to benefit by it again next summer if he is to return to the "tour de role."

On March 1, the Commission examined Dr. Page, who testified that he was appointed examiner of the eyesight of pilots by the Deputy Minister of Marine in February, 1906. He thought the examination to which pilots were subjected here was good, but that the eye test for

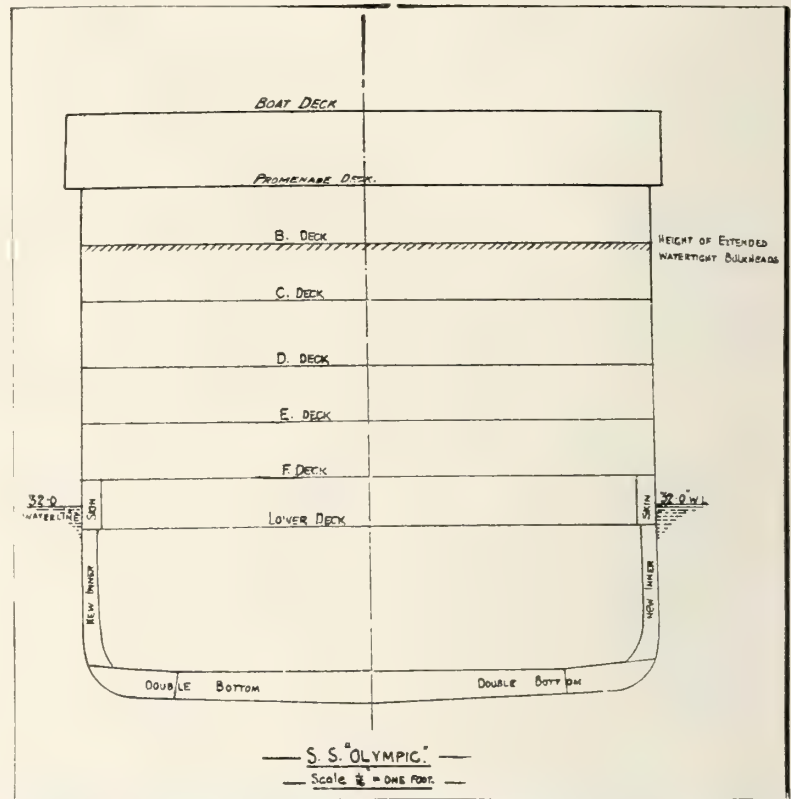
out what his duties were further than wait for instructions. He said that he had never received any printed instructions as to what his duties were, but he thought that he would be able to perform his duties as soon as navigation opened.

"When do you expect navigation will open this year?" asked Mr. Holden.

"Well, sometimes it opens early, and sometimes it opens late. I suppose it will open this year whenever He will," the witness replied.

"Whenever who will?" asked Mr. Holden.

Answer—"The First Master, God."



SECTION SHOWING THE ALTERATIONS TO THE "OLYMPIC'S" HULL WHICH ARE BEING CARRIED OUT BY MESSRS. HARLAND & WOLFF, LIMITED.

the apprentices might be more severe. Dr. Page said that a man's eyesight might be affected temporarily and get perfectly well within a few days.

A Farmer a Chief Pilot.

Mr. Thibaudeau, who had been Government Superintendent of the Montreal Pilots at Quebec up to December last, and his successor, Joseph Frenette, were examined. Mr. Frenette testified that he was 66 years of age. He had never been to sea in his life, but was a farmer, and a captain in the militia. He had also kept a boarding house.

"Was it a temperance hotel?" asked Commissioner Robb.

"Yes, sir! Yes, sir!" responded the witness.

The witness admitted that he had been appointed to the position since December last, but had taken no steps to find

Pilots Make Suggestion.

It was decided by the Corporation of Quebec Pilots that they would relinquish the position of superintendent of pilots which has been held by pilot Talbot, and that they would leave the Shipping Federation the right of suggesting a candidate to be appointed superintendent by the Government.

A letter to that effect was read before the Commission after Mr. Talbot, the present Superintendent of Pilots, had said that he would resign next April.

Mr. Holden, K.C., appearing for the Shipping Federation, congratulated the pilots on the concession and asked them to endeavor to devise some means of improving the position of apprentice pilots.

On March 3, the entire morning session of the Pilotage Commission, which resumed its investigation in the Board

of Trade Council Chamber, Montreal, was taken up by a presentation of Ontario's grievances against the present pilotage regulations, followed by a discussion between the representative lawyers of the Shipping Federation of Canada, with headquarters at Montreal, and the Dominion Marine Association, with headquarters at Toronto.

Complained of Discrimination.

Mr. Francis King, of Kingston counsel for the Dominion Marine Association, urged the claims of Ontario. He drew attention to the apparently unwarranted discrimination against the Province of Ontario, whereby all vessels trading between the ports of Quebec, Nova Scotia, New Brunswick, Prince Edward Island, and even Newfoundland, and the Atlantic Coast as far as New York, are declared exempt from the compulsory payment of pilotage dues, while vessels trading from Ontario ports to those other provinces are required to pay these dues.

"This discrimination," he said, "was made more marked by an amendment depriving the Province of Ontario of even the limited measure of exemption which its vessels previously enjoyed when drawing less than 16 feet of water, thus rendering all Ontario vessels which have passed through the St. Lawrence 14 ft. canals liable to dues in Montreal Harbor, including pilotage dues every time the vessels move in the harbor." The latter proved to be a particularly obnoxious regulation to Ontario ships. Moving from one dock to another costs Ontario vessels on an average of \$25, \$30 or more each trip.

Mr. King claimed that the services of a pilot were unnecessary. "And what does the pilot do anyway?" he said, when Mr. Gauthier, president of the Montreal Pilots' Association, took exception to this remark. "When he gets aboard he picks out the best chair obtainable, smokes a cigar or two, and then takes his departure after the vessel has been docked." In conclusion, Mr. King asked that Ontario be placed on an equal footing with Quebec, that master and mates be permitted to obtain licenses, that tow barks might be exempted from pilotage service, and that moving charges in Montreal harbor be eliminated.

Evidence on Eye Tests.

That the present standard of eye tests for the St. Lawrence River pilots is not good was the statement made before the Pilotage Commission by Dr. P. Coote, oculist. Dr. Coote was of the opinion that the standard approved by the Marine Francaise for eye tests would, if applied, lead to a great improvement in the pilots, and would automatically make the service good with-

in a short time. He said that the standard applied did not eliminate the defects in color vision, while the test of the Marine Francaise did. The standard of the Marine Francaise, he said, was full normal vision.

Dr. Coote gave some illustrations of the inefficiency of the present vision examination passed by members of the Pilot Corporation before they assume their duties. In the year 1900, said Dr. Coote, a pilot named Jacques Arcand passed the examination with success, and was granted the right to pilot ships between Quebec and Montreal for the ensuing year. Arcand was not satisfied with that diploma, and went to a specialist to have his sight examined again. The doctor told him that his eyes were not fit for his work, and advised him to ask to be put on the pension list. Arcand made his application, but the Corporation refused to grant it. A few days later, said Dr. Coote, Arcand was responsible for the grounding of a steamer in the St. Lawrence.

Mr. Wilbrod Gauthier, president of the Pilot Corporation of Montreal, asked to explain the case of Jacques Arcand, which was brought forward by Dr. Coote. At the time of the accident pilots who were under 65 years of age were not compelled to pass annual examinations for their sight and general health. The trouble with Arcand was his lack of skill. It was in broad daylight that he grounded a steamship on the shore, which demonstrated that the fault was not all in the weakness of his eyes.

Eye Test in London.

Dr. Page, medical superintendent of the local immigration department, said that Dr. Coote was evidently not aware that since 1907 the eye test applied here for pilots was the same as that applied in London. He said that the Corporation of Pilots had no influence whatever on the examination of the pilots' eyes. In his opinion the British and French tests for eyesight were about equal.

Spoke Favorably of Pilots.

The next witness was Mr. G. B. Ramsey, of the White Star-Dominion Steamship Line. He said he found the pilots all right. He had selected pilots for many lines, and never had reason to complain of the service. With regard to apprentices, he would make rules for their admission more stringent with regard to their health, etc. They should have a special vessel, sailing preferred, supplied by the Government, to go up and down the river, to take soundings, learn the currents, etc. He had not a great deal to do with the Montreal pilots, although they employed six. They did business with the Montreal office.

To Mr. Lachance witness said his

office had in 25 years covered some 2,000 pilotages. In 10 years there were 39 accidents. Nine of these occurred in cases where the vessels were in charge of Quebec pilots, 16 while in charge of captains, 6 in charge of Montreal pilots, and the balance due to machinery.

Inspection at Father Point.

Mr. Ramsey thought that steamers should be inspected at Father Point to save delay and prevent accidents. The present system of holding investigations into accidents was not satisfactory. The court should be composed of a judge, with two nautical assessors who have no connection with the Government, which is as much on trial as the pilots and office. He could give no reason why a steamer should go ashore twice near the same place. He thought there would be more of an incentive to young men to become pilots if they got all they earned. He would say again that the list of accidents he furnished was not a record of wrecks. If passenger steamers were inspected at Father Point, and they received a clean bill of health, they could then come to port without stopping at Grosse Isle, where one of their vessels went ashore while waiting.

End of the Inquiry.

The pilotage inquiry came to a close on March 11, when Mr. Holden, on behalf of the Shipping Federation, and Messrs. A. Rivard and E. Belleau, for the pilots, summed up their respective sides of the inquiry. When the sitting was resumed in the afternoon, Mr. Lamontagne, secretary-treasurer of the Corporation of Pilots, produced a number of papers which the commission had called for. In reply to Mr. Holden, witness stated that a candidate for an apprentice pilot must be recommended by a member of the Corporation. Vice-President Bernier, of the Corporation, was also recalled, and asked the same question, replying that he knew nothing about it.

Mr. Holden then commenced summing up, traversing the testimony adduced at the inquiry at length. He congratulated the commission and the Corporation of Pilots on the way they had acted during the investigation. He said he felt that a dangerous state of affairs had existed here for the past fifty years. He said that there were serious disasters here last season to vessels while in charge of pilots. These accidents demanded very serious investigation and correction. He did not hold the pilots entirely to blame for the existence of the present state of affairs, but those who did not attempt to improve it. He quoted the Shipping Act and the Statutes of Canada to show who had authority over the port of Quebec, and the extent of the Minister of Marine's

authority. He considered that this conflict of authority was wrong. He was not opposed to pilots uniting, but it should be an association, as elsewhere. He objected to a board of directors of six to control the body. It should be controlled by a salaried officer of the department.

Eye Test Should be Severe.

Referring to the office of superintendent, Mr. Holden stated that it was not promising for the future. He argued that if the Corporation controlled the pilots it should be responsible for their acts. Mr. Holden maintained that the evidence made it appear that it was impossible for an apprentice to enter the service unless he was a protege of a member of the Corporation. He also dealt with the dual language qualification and the eye test. In regard to the latter he thought the tests should be more severe and that an apprentice should be examined first by an expert oculist and then by a Government official. After alluding to other facts brought out in the inquiry, Mr. Holden declared that there was need of a radical change in the pilotage system, and that the system should be open to all and unburdened by any unessential restrictions.

Mr. Rivard's Summing Up.

Mr. Rivard followed on behalf of the pilots. The Shipping Federation, he stated, was asking the corporation to

make improvements, which it was not within the province of the corporation to carry out. There was nothing to prove, he contended, that the pilotage system was not open to all. He next dealt with the age limit. He did not believe in the theory that it would be a good thing to limit the age to sixty-five years. Such a step might be the means of keeping the best pilot in the corporation from the St. Lawrence service. As to the alleged dual control, Mr. Rivard considered that article 433 of the Shipping Act made it plain that the control of the system lay with the Minister of Marine and Fisheries.

Mr. Rivard then elaborated the argument that it was in the public interest and in the interest of trade and navigation that the pilots should pool their earnings, and that to attempt to coerce them to do otherwise would be to interfere with their private rights. He thought that if they abolished the corporation and did not allow them to pool their earnings they would revert to the old, unnatural and unwholesome competition which their incorporation had been intended to remedy. Pilots might be held up by captains, masters, etc., who would threaten to take another pilot. Far from reducing the efficiency of the pilots, said Mr. Rivard, the present system ensured that there should be good pilots for all vessels whether big or small, a thing that would not be possible otherwise. Discussing

the eyesight tests and the criticism that had been directed at Dr. Page in this connection, Mr. Rivard said that the doctor had received no instructions as to standard, and had, therefore, established one himself.

The commissioners are now engaged in going over approximately 3,000 pages of evidence taken at Montreal and Quebec. Nearly 300 witnesses were examined altogether. After carefully weighing the evidence taken, a report will be prepared and submitted to the Government.



VICTORIA—SYDNEY ROUTE.

THE Niagara, the new steamship of the Union Steamship Co., of New Zealand's big passenger fleet, is, according to the latest schedule of the Canadian Australian line, fixed to leave Sydney for Victoria, May 5, replacing the Huddart-Parker liner Zealandia on the route between Australia, New Zealand and the Dominion. Captain John Gibb, formerly in command of the steamer Makura, is piloting the huge passenger steamship from the Clyde yards of Messrs. John Brown & Co. by the way of Suez Canal to Australia.

Arriving at Sydney just in time to handle the brunt of the Summer tourist traffic, there is no doubt that the Niagara will carry her full capacity of passengers on her maiden voyage to Victoria. Leaving Sydney May 5, she



CANADIAN AUSTRALIAN LINE—NEW STEAMSHIP "NIAGARA." VANCOUVER-AUSTRALIAN SERVICE.

will call at Auckland four days later, calling at Suva May 13, Honolulu May 20, and is due to reach Victoria May 27.

On her return voyage to Australia the Niagara will leave Victoria June 11 and is due to again reach Sydney July 5. This is the last word in modern shipbuilding and was constructed especially for the Canadian-Australian trade. The Niagara is of 13,500 tons register and will be driven by combined reciprocating and turbine engines developing 13,000 horsepower. The dimensions of the vessel are: Length 543 feet; beam, 66 feet, and depth 37.6 feet.



THE ESTEVAN AT VICTORIA, B.C.

THE Government Steamer Estevan, which was built by the Collingwood Shipbuilding Co., and left Collingwood on Nov. 4th, 1912, has reached Victoria, B.C. During the intervening four months the steamer has made the trip of about 17,000 miles. Throughout the long voyage, the little steamer only 185 feet in length, proved herself sea-worthy in every respect, and demonstrated her capabilities for service as a tender for lighthouses on the Pacific coast, for which she was specially constructed. Captain Lindgren, who has taken out a number of steamers, including the C.P.R. Princesses, was in charge of the Estevan from Collingwood to Victoria.



G. T. P. STEAMER SERVICE.

It is said that a proposed run direct from Vancouver to Skidegate, and thence to Masset, will be included in the spring schedule of the Grand Trunk Pacific Steamship Co., which will shortly be issued. The freight business between the south and the islands is growing rapidly, and the G. T. P. officials figure on saving time and doing a good business in this way. According to the despatch, the service will probably be inaugurated about the beginning of April.



PRAISE FOR VICTORIA B.C.

RECENT Sydney (Australia) papers contain an interview with Captain Alexander Sangster, of the New South Wales Navigation Department, who recently returned from a visit to Canada.

Captain Sangster, especially compliments Victoria, B.C., on the possession of such efficient marine railways and a dry dock. He goes into detail as to the facilities here for the rapid repair of vessels as compared with other places he visited, and in regard to the subsidizing of a salvage plant he mentioned that

the Australian Governments do not do such a sensible thing. Of the plant maintained by the B. C. Salvage Co. he says: "It is a huge plant, up-to-date in every way, and lots of good work has been done in the salvaging of vessels."

The traveler from the Antipodes was enthusiastic in regard to the ferry service maintained between Victoria and Vancouver by the B. C. Coast Service of the Canadian Pacific Railway. The manner in which great numbers of passengers are handled excited his admiration, and he hinted that something of the kind should be inaugurated in the Commonwealth. He said:

"I saw the fast coasters of the C.P.R. which make a speed of from twenty to twenty-two knots an hour, and maintain the running between Victoria Vancouver and Seattle in such a way that you can set your watch by them. They are beautifully fitted and keep up their speed in all sorts of weather. When the steamers are ready, the passengers go aboard—all the farwells are said in the waiting room, there is no delay, no confusion, and no chance for pilferers to get aboard at the luggage. It is a great scheme and a successful one. Then when it comes to disembarking, it is the same. The steamer comes alongside a big double-decked wharf, the top deck being for passengers and the lower deck for freight. There is neither confusion nor delay. Customs officers are waiting to examine the luggage, when between foreign ports, and you pass along in a constant stream.

The handling of lumber cargoes on the Frazer River he considered the last word in that phase of cargo-stowing.



R. AND O. OFFICIALS.

WITH the reorganization of the Richelieu and Ontario Navigation Co., many changes have taken place among the officials, and recently the management issued a circular giving a list of their officers as follows:—

James Playfair, managing director.

J. I. Hobson, comptroller and treasurer.

F. Percy Smith, secretary.

H. H. Gildersleeve, manager western lines, with headquarters at Toronto.

Thos. Henry, manager eastern lines, with headquarters at Montreal.

Gilbert Johnston, mechanical superintendent, with headquarters at Montreal.

L. A. W. Doherty, freight traffic manager, with headquarters at Toronto.

H. Foster Chaffee, passenger traffic manager, with headquarters at Montreal.

W. F. Cloney, district passenger agent, Buffalo—Rochester and west in New York State, Western Pennsyl-

vania, Central and Southern United States.

J. W. Caivin, district passenger agent, Alexandria Bay—Montreal to Kingston in Canada, New York State, east of Rochester, Eastern Pennsylvania and the Atlantic seaboard.

J. F. Dolan, district passenger agent, Boston, Mass.—Montreal and east in Canada and the New England States.

John V. Foy, district passenger agent, Toronto—Kingston and west in Canada, Michigan, Illinois and the north-western States.

S. J. Murphy, T.P.A., and excursion agent, Toronto—all excursion business for the Niagara Navigation Co.

George Pujos, excursion agent, in charge ticket department, Montreal.

John F. Pierce, assistant general passenger agent and general baggage agent, with office at Montreal.

Hugh D. Paterson, general agent, passenger department, with office at Toronto.

Jos. F. Dolan, district passenger agent, with office at Boston, Mass.



BRITISH ENGINEER'S VISIT.

WITH the arrival of Sir John Jackson, president of the Sir John Jackson Construction and Engineering Co., of London and Canada, at Montreal last week, rumors were started as to the probable business which brought him to this country. He is one of the most noted of British engineers and contractors, some of the work which he has undertaken and carried out being world famous.

The Sir John Jackson Company have a contract of two million dollars for improved harbor facilities at Victoria, B.C., and they were the only firm to tender for the Dry Dock to be constructed at Levis, P.Q. Rumors in circulation are to the effect that he was in Montreal in connection with the new tunnel which it is proposed to build under the St. Lawrence to the South Shore, and credence was given this rumor by the fact that the Company's men were engaged in making surveys of this work some months ago.



ADDITIONS TO THE C. N. R. FLEET.

TWO new liners will be added to the C. N. R. Royal line by the spring of next year, according to report. It is stated that the additions will be absolutely necessary if the C. N. R. is to handle the increased traffic over its own rails, which extensions now being made will render possible by the spring of 1914.

Canadian Pacific Railway Co. Elevator, Port McNicholl, Ont.

The idea of establishing the Port McNicholl terminal with elevator accommodation, in addition to those existent at the head of Lake Superior, had, as its purpose, the storage and reloading of grain into railroad cars for transportation with greater efficiency, eastwards through Canadian territory. That the step taken was a wise one has been amply proven.

PORT McNicholl is situated at the extreme eastern end of the Georgian Bay, about 7 miles from Midland. Here an elevator of 2,000,000 bushels' capacity was completed early in 1911. After about a year's operation, it was clearly demonstrated that in order to

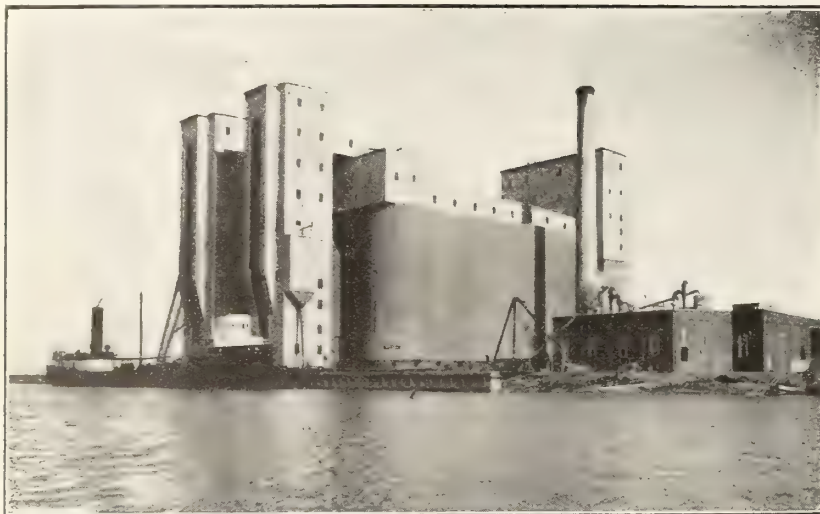
pleted in time to be filled with the 1911 crop before the close of lake navigation. It is 179 feet wide and 226 feet long, making the total length of the elevator 452 feet. There are altogether 64 cylindrical bins, each 32 feet 11 inches in diameter, and 62 interspace bins. The

with corrugated iron, the whole being mounted upon 40 heavy car wheels. Steel stairs run all the way from the bottom to the top, and the roof and floors are of concrete. Each of the towers has a capacity of 20,000 bushels per hour, and each one is self-propelling, traveling independently of the other on a double track between the storage house and the slip. The marine legs are designed so that they can enter passenger boats as well as freight boats, and a complete set of air operated shovels and clean up shovels is provided to bring the grain to the legs as rapidly as possible.

Grain is delivered to 1,000 bushels scales, after which it is taken to the top of the towers and dropped into one of the bins of the storage house or working house. The longitudinal conveyors which receive the grain from the marine towers run the entire length of the two units. Grain for shipment from the new portion is conveyed through the basement of the first storage to the car shipping house. In this car shipping house 200 cars can be loaded in 10 hours. Cars can also be unloaded in the working house and boats loaded by means of a special loading spout on one of the towers.

Power Equipment.

All the machinery is electrically driven, power being generated in a steam plant separate from the main building, and shown at the extreme



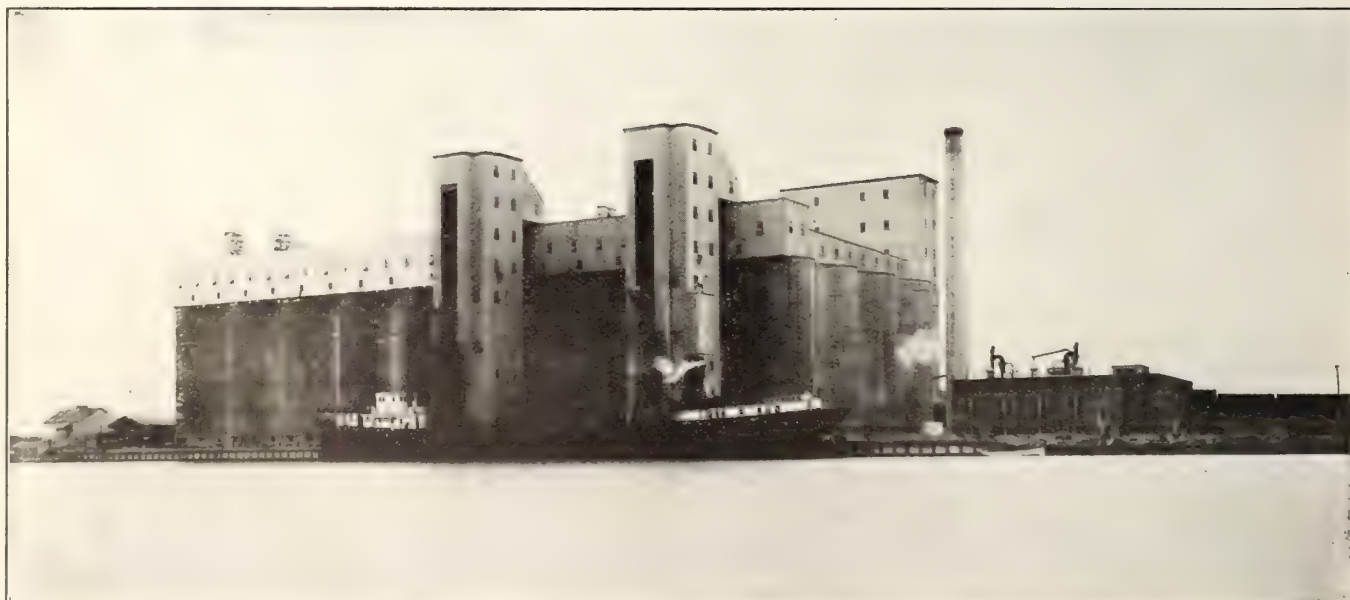
C.P.R. GRAIN ELEVATOR AT PORT McNICHOLL, ONT.

take care of the vast volume of business offering an addition was at once absolutely necessary. Steps were, therefore, taken to provide this by building another storage unit of equal capacity to the original.

The New Storage Unit.

The new storage unit is an exact duplicate of the first, and was com-

pleted in time to be filled with the 1911 crop before the close of lake navigation. The walls of the bins are 80 feet high. The entire structure is of steel and concrete. The two marine towers which traveled along the side of the original elevator fill also the new storage unit. Each marine tower is 150 feet in height. and consists of structural steel covered



C.P.R. ELEVATOR AT PORT McNICHOLL, ONT., WITH NEW STORAGE ADDITION COMPLETED.

right in Figs. 1 and 2. There are installed two Westinghouse-Parsons steam turbines, direct connected to generators; the plant having a capacity of 1,500 horse-power steam at 160 lbs. pressure, is supplied by six Babcock & Wilcox water tube boilers of 250 h.p. each. The smoke stack, of reinforced concrete, is 160 feet in height. Besides supplying motive power, the plant takes care of an elaborate system of incandescence and arc lamps, making night operation as easy as that of day time.

There are about $1\frac{1}{2}$ miles of wharves altogether, and it is planned to add storage units whenever the volume of business renders these imperative, there being adequate room for future exten-

Metcalf Co., engineers, of Montreal and Chicago.

THE COLOSSUS OF THE SEAS.

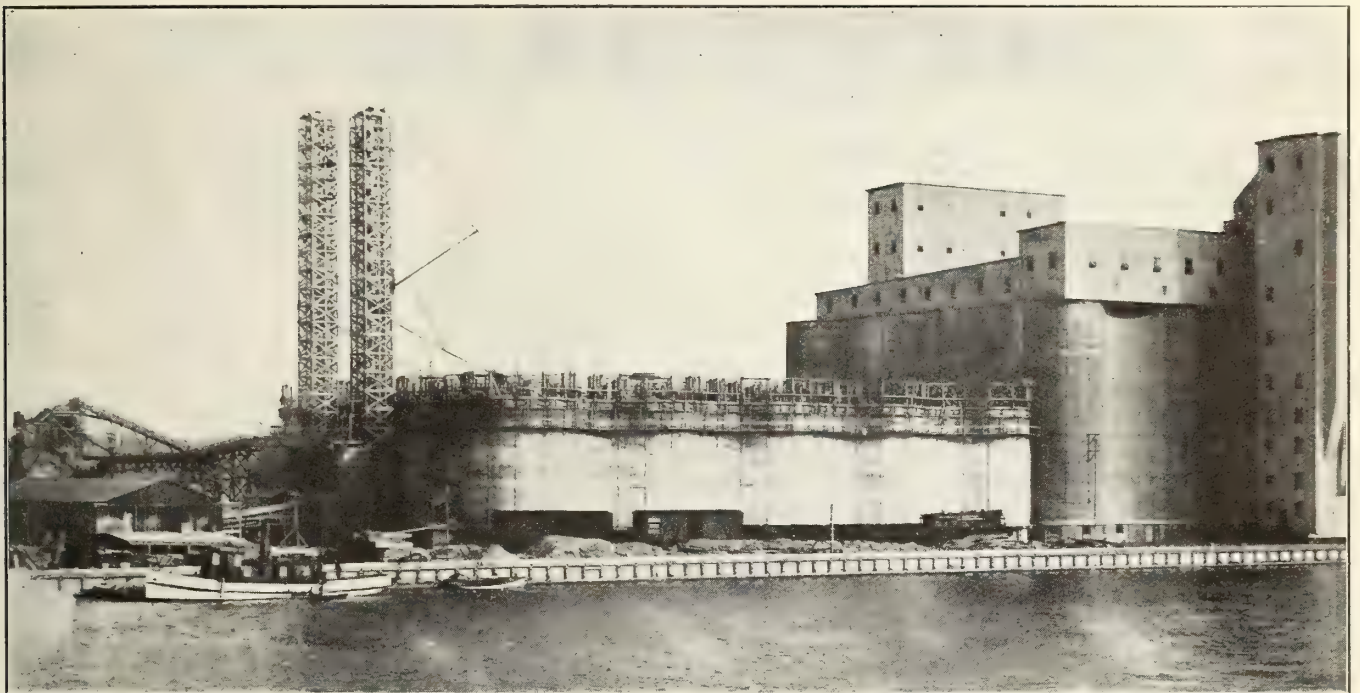
THE Royal Mail Packet Co. have purchased the Nelson Line of steamers at a total price of \$5,434,545. The Nelson Line has a registered capital of £1,000,000 sterling, and has valuable contracts with the Swifts and several Argentine meat companies for the transportation of frozen or chilled meats between the River Plate and London. In addition it operates a passenger line with ten steamships.

This new acquisition makes the Royal Mail Steam Packet Co. the largest

effected. The following figures are from a report made by one of the company's officials and show the comparative cost of the two kinds of fuel.

Burning coal, the daily cost for the Princess Charlotte was 100 tons of coal at \$4.50 per ton, or a total of \$450 for this item alone. The wages of 13 firemen amounted every day to \$23.80, wages of 10 trimmers to \$15, and food for the 23 men cost \$9.50, or a total cost per diem of \$498.36.

Burning oil, the Princess Charlotte consumes 344.17 barrels a day at a cost of 90 cents per barrel, a total for oil fuel of \$314.25 a day. The wages of the six firemen employed amount to \$11.10 per diem, and their food to \$2.52, or a



C.P.R. ELEVATOR AT PORT McNICHOLL, ONT., WITH NEW STORAGE ADDITION UNDER CONSTRUCTION.

sions up to 10,000,000 bushels capacity. The entire plant is fireproof, for, excepting the transmission ropes, there is nothing combustible about it. All the windows have wired glass, and metal conduits have been provided for the electric wiring. A fire pump supplies water to the various hydrants placed throughout the elevator.

The plant has a flour shed, 700 feet long, and also a freight shed, of the same length. There is a carpenter shop, a coal platform, a pump house and a Customs house. In addition, a sleeping house and an eating house have been provided for the freight porters. The construction work was carried out under the supervision of J. M. R. Fairbairn, assistant chief engineer of the Canadian Pacific Railway, and C. W. P. Ramsey, engineer of construction for the company; while the structure was designed and erected by the John S.

steamship company in the world, with a total tonnage of 1,514,854 as against 1,240,000 tons owned by the Hamburg-American Line, and Sir Owen Phillips becomes in reality, as he has often been called, the "Colossus of the Seas." He is only 49 years of age, and since becoming Chairman of the Company in 1903, he has acquired the following lines The Elder-Dempster, Forward Line to Morocco, the Pacific Steam Navigation Co., the Shire Line, Lamport and Holt, the Union Castle, and now the Nelson Line.

OIL FUEL SAVES EXPENSE.

SINCE the C. P. R. Pacific Coast steamers, Princess Victoria and Princess Charlotte, have been changed from coal burners to oil burners for steam railway purposes, a considerable saving in operating expenses has been

total cost of \$327.87 per day, which is a difference in favor of oil of \$170.49 a day. The difference in favor of oil per day on the Princess Victoria, a smaller vessel, is \$159.69.

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Vol. III

MARCH, 1913

No. 3

THE ST. LAWRENCE PILOTAGE INVESTIGATION.

IN the present issue of our journal will be found the second and final portion of the evidence submitted to the commission appointed to inquire into pilotage conditions as presently existent on the St. Lawrence River below Montreal, and in the Gulf. The necessity for the appointment of this Commission of Investigation arose through sheer force of circumstances, jeopardizing, as these were, the utility and effectiveness of the St. Lawrence as a commercial asset of our country. Marine men all over the Dominion have an interest in this subject, and when it is taken into consideration that business men are equally involved and affected, it is safe to say that no stone should be left unturned to remove whatever reproach belongs to our main artery and highway of international trade and commerce.

It cannot be said that the information brought out at the inquiry is at all conducive to a continuance of the present methods and arrangements whereby pilots live, move and have their being, in short, we are inclined to believe that what has been probed puts the pilotage question in an infinitely worse light than we had, perhaps, reason to expect. It will, we believe, be the general consensus of opinion among our readers that nothing short of a revolution of the whole system will bring about satisfactory results in the safe navigation of our great ocean highway.



CANADA AND EMERGENCIES.

WHETHER we be Tories or Liberals, Imperialists or Nationalists, Canadian-born or otherwise, we are grieved to be told by Mr. Winston Churchill, First Lord of the British Admiralty, that Canada is unable to build and man battleships in sufficient time to meet the emergency. After reading Mr. Churchill's letter to the Premier, we are inclined to cry out, that 'nothing is impossible

with Canadians, for did they not, thirty years ago, build the greatest railway in the world, and are they not to-day building equipment for this and two others?' We are compelled, however to admit the accuracy of Mr. Churchill's statement. The emergency, which is said to exist, creates a situation requiring prompt action if Great Britain is effectually to compete with Germany.

Without this emergency, the assertion of the First Lord would be ridiculous, being analogous to a declaration that farmer Jones cannot supply eggs for the Sunday school picnic, because he has no hens. Cannot Jones buy some hens? Yes, but he cannot force them to lay, and the picnic is to-day. It occurs to one after a little thought, that Jones may, after all, buy the hens and supply the eggs for next year's picnic.

So it is with Canada. Let her meet this emergency with what come readiest to hand, and then prepare to meet the next one herself. It is childish to suppose that no other call will be made on this country for battleships. The next battleships should be built here, and preparations made now. Preparations are, of course, being made. Shipbuilding plants are being projected on a large scale both in the East and West, and every support should be given to them.

We are told by Mr. Churchill that "for the manufacture of armor plates, large steel furnaces, heavy rolling mills, etc., capable of dealing with weights of 150 tons at a time, have to be provided, besides which the special treatment to obtain the correct quality of plates requires special experts who have been brought up to nothing else. Such men could not be obtained in Canada."

Such men can be obtained in Canada, and Canada is not limited to her own population. If she can bring experts from Great Britain and the United States to plan her waterworks systems, she can also obtain shipbuilding experts from abroad. Mr. Churchill loses sight of the emergency in his calculations. In every one of his statements regarding Canada's inability, the words 'under the circumstances' should be appended, or the statement sounds untrue and ridiculous.

The First Lord of the Admiralty lays much stress on the fact that the cost of doing this work here will be about twice what it would be in Great Britain, and that the officers and crews of the Rainbow and the Niobe receive two-thirds more wages than those in the Imperial navy. Exactly. The men sweeping the streets of Toronto receive two-thirds more wages than the men sweeping the streets of London, England, yet nobody has ever considered it an outrage. If the United States had taken wages into consideration, she would not have had her shipyards and arsenals to-day, but would be ordering her battleships in Great Britain, where they are cheap.

Canada is reminded of certain South American States who bought warships, and by non-attention, allowed them to scrap. These Southern States are not autonomous in the sense Canada is. Their warships were merely immense toys, for which they had no use, for once they put them to work, the Monroe Doctrine stepped in, and this made them useless.

Canada must, first of all, put herself in the right frame of mind. Her initial attempt to equip a navy has been a joke, which nobody laughs at, because of its realized seriousness. The naval profession in this Dominion must be lifted to a standard equal to that of Great Britain. The highest positions must be available to the humblest, so that it will be as honorable and lucrative to be a captain in the Canadian navy as to be chief engineer of a railway division. When this consummation is attained, Canada will be more of a nation, and emergencies will not humiliate her.

READERS' NOTES AND VIEWPOINT

Devoted to Brief Article Contributions Covering Experiences, Correspondence and Comment on Matters Marine. We Pay for Suitable Material.

PITCHING PROPELLERS.

By J. Livingston Booth.

OF all the problems confronting the marine engineer, there is none that presents so many difficulties as that of propeller design. It is probably true that the majority of successful propellers are those in which the design has been based upon data obtained from the careful observation of the performance of propellers operating under as nearly as possible similar conditions. Therefore, whether we base our design on previous experience or decide to work on more scientific lines, it is necessary to have a means of knowing exactly the various conditions that we have to deal with, and also of insuring that the design is adhered to in manufacture.

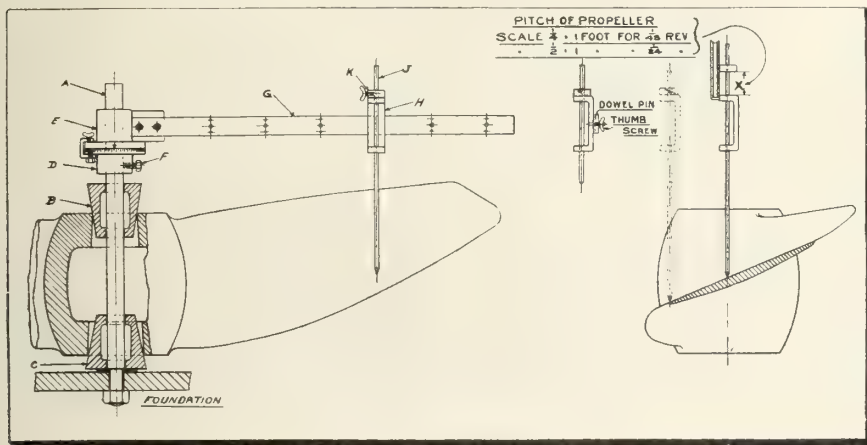
A very useful piece of apparatus for measuring the pitch of propellers is shown in the accompanying sketch, and

the parts (D) and (E), which are also of cast iron, the lower can be fixed in any position on the spindle by means of the setscrew (F), while the upper half which is a running fit on spindle, has a lug cast on it to carry the steel arm (G). This arm is drilled at different distances from the centre of the spindle, usually increasing by 6 inches, to take the guide (H) and pointer (J), which has a movable collar and thumbscrew (K). The circumference of the part (D) is divided into 48 equal parts, while an arrow is stamped on the circumference of the upper part (E).

To take the pitch, the propeller is centred true with the spindle by means of the taper blocks (B) and (C), and the arm and pointer slipped on spindle, the lower half being secured by the setscrew at a convenient height to suit the length of pointer. The arrow on (E) is then set on one of the divisions on (D)

sary in the manufacture of propellers for torpedo boats and similar work. When the blades have been cleaned up and polished, the pitch is taken in the presence of an Admiralty inspector. A series of readings is taken close to the root of the blade, a second series near the tip, and either one or two series across the full part of the blade, depending on the size of propeller. The average of each of these series of readings at different radii is taken, and the average of the results obtained is again taken to give the average for the blade. This is repeated for each blade, and the average of the number of blades is then taken, which is considered the true pitch of the propeller. If this differs by more than a small amount from the designed pitch the propeller is rejected.

The writer has frequently used the apparatus here shown for Admiralty work of this description, and the large number of readings required can be taken in a very short time. There are many little improvements that will suggest themselves to the mind of the practical man, such as the guiding of the pointer to prevent its revolving and the addition of an arrow reading on a permanent scale attached to the guide. The apparatus can be modified to suit the conditions under which it is used.



PITCHING PROPELLERS.

will appeal to those engaged in this class of work, not only by its simplicity and inexpensiveness, but also on account of the rapidity and accuracy with which the pitch can be taken at different points on the blades of a propeller. It can be used for any type of propeller, and is especially useful for small ones having movable blades, and large ones having adjustable blades secured to the boss by bolts; when setting the required pitch, at the time the cod pieces round the bolts, are being fitted.

The apparatus consists of a spindle (A), bolted to a suitable foundation, which may be of a permanent character, or if the apparatus is not in use sufficiently often to justify this, a marking out table can be used. The two cast iron blocks (B) (C) are a sliding fit on the spindle and are turned taper to take propeller bosses of different bores. Of

and the propeller swung round until the lower edge of one of the blades just touches the pointer when near its lowest position. The collar (K) is then tightened up to hold the pointer in a position just touching the blade. The pointer is then raised and the arm moved round 1-48th of a revolution. The pointer is then dropped until it just touches the blade, and the distance (X), read on a scale of $\frac{1}{4}$ inch to the foot, is the pitch of the propeller. If it is more convenient to take two of the spaces for a reading, that is, a movement of 1-24th of a revolution, the distance (X) must be read on a scale of $\frac{1}{2}$ inch to the foot. In this manner several readings can be taken across each blade at different radii from the centre.

In connection with this it is interesting to note the degree of accuracy that the British Admiralty consider neces-

A LARGE DREDGER.

A FOUR-YARD dipper dredger with a 70 ft. steel boom and a 48 ft. dipper handle was at work during the past summer and autumn on a section of the Erie Canal. Its size enables the full 75 ft. bottom width of the canal to be dredged in one cut, and the excavated material delivered over the embankment into spoil banks. The hull of the dredger is 106 ft. long, 38 ft. wide, and 8 ft. 6 in. deep forward and 7 ft. aft. It is built of Georgia pine and is stiffened by two steel trusses 13 ft. deep, spaced 24 ft. on centres. These trusses are connected to a steel cross truss forward, forming the casing for the 24 in. square steel spuds. The main engines are 12 in. by 16 in. compound, and the swinging and spud engines are 9 in. by 9 in. compound. The boiler, of the marine type, is 9 ft. 6 in. in diameter and 14 ft. long. The dredger was in continuous operation for four months, and during that time not more than 12 hours of working time were lost by reason of stoppage of machinery. The section dredged covered about six miles.

THE HUDSON BAY PORT PROJECT.

THE Canadian Government intend early in the spring to take active steps to render the entrance to Hudson Bay easy of navigation by large steamers. Lighthouses are to be built, buoys laid down, and various important works will be undertaken at Port Nelson, Fort Churchill, and along the Hudson Strait. A careful survey of the whole district has been made, and recommendations will in due course be submitted to the Department of Marine. As most of our readers are doubtless aware, there is to be a railway from the wheat district of Saskatchewan to Fort Churchill, and the advocates of this route claim that it will provide a ready and cheap outlet for grain.

Many people able to speak with authority maintain, however, that the Hudson Bay route can never be made a successful proposition. The season of open navigation is, they declare, too short to enable any large proportion of the annual harvest to be shipped; elevator storage would be far more costly than, say, at Port Arthur or Fort William; and

Liverpool to Montreal	2,990
Montreal to Vancouver	2,906
Liverpool to Vancouver	5,896

As far back as 1886, the Dominion Government despatched an expedition to investigate the navigability of Hudson Strait for commercial purposes, and the verdict of the commander, Lieut. Gordon, was scarcely encouraging. "Altogether," he wrote, after making some general observations on the navigation of Hudson Strait and Bay, "I consider the navigation of Hudson Strait as being more than ordinarily difficult, with shores inhospitable and bleak, presenting such a picture of loneliness and desolation that it takes some time to get accustomed to it. The only safety in thick weather lies in the constant use of the lead and keeping a bright look-out, as the dead reckoning is frequently in error to a considerable extent." Later, he expresses the opinion that a shipowner who permitted his vessel to enter the Bay before the middle of July would be subjected to such delays as would add very seriously to the cost of

work by July. Owing to the mildness of the winter, good progress has been made at the site of the drydock and breakwater.

GRAIN AT HEAD OF LAKES

A REPORT just compiled at Port Arthur, Ont. by a leading elevator firm shows that grain is piling up at the American head of the lakes at an alarming rate, the quantity in storage on March 7, exceeding that of the same date last year by more than seven million bushels. Of wheat alone, there is now at Superior and Duluth 12,620,484 bushels, as against 7,635,700 bushels in 1912, and of flax there is to-day 2,610,704 bushels as against 585,588 bushels one year ago. This does not include bonded flax, of which there is 900,000 bushels on hand, more than 700,000 bushels in excess of 1912.

Four great elevator systems at the head of the lakes are now practically filled, and the remaining two have room only for six or eight million bushels more. Receipts are running from two



MOUTH OF THE NELSON RIVER NEAR PORT NELSON.

the interest on capital locked up in wheat at Hudson Bay from October in one year to August in the next would be another very serious consideration. Then, too, it is probable that the premiums on vessels using the Hudson Bay route would be on such a scale that would more than counterbalance any saving which might be effected in the cost of transportation. The new route would, of course, shorten the distance between Western Canada and the United Kingdom; in fact, as the following table shows, the actual reduction on a journey from Liverpool to Vancouver would be 1,328 miles:—

	Miles.
Liverpool to Fort Churchill	2,926
Fort Churchill to Calgary	1,000
Calgary to Vancouver	642
Liverpool to Vancouver	4,568

the voyage; while any vessel leaving the Bay after the middle of October would be faced with grave risk of becoming ice-bound.

The fact that the Hudson Bay route is to a large extent a pawn in Canadian party politics has tended to cloud the issue from a purely commercial standpoint, and, consequently, it is difficult to discover what are the real merits, if any, of the scheme.

ST. JOHN DRYDOCK.

DREDGING at Courtenay Bay, St. John, will be resumed on April 1. The Norton Griffiths Co. started this work last fall and expected to be able to work all the winter, but found the undertow too strong for them. They will start with two dredges and expect to have another large suction dredge at

hundred and fifty to three hundred thousand per day.

R. & O. NAVIGATION CO.

MR. James Carruthers, President, and Mr. J. R. Binning, Chairman, of the R. & O. Navigation Co., accompanied by Hon. J. P. B. Casgrain, paid an official visit of inspection to Sorel, P.Q., on March 7.

Official circulars have been issued confirming the appointments which James Playfair announced on March 1, together with the following additional appointments not included in that list: J. I. Hobson, Comptroller and Treasurer; F. Percy Smith, Secretary; H. H. Gildersleeve, manager of western lines, with headquarters at Montreal, and Gilbert Johnson, Mechanical Superintendent, with headquarters at Montreal.

MARINE NEWS FROM EVERY SOURCE

Fort William, Ont.—The city may build an extra dock here, where boats may call and take on passengers.

St. John, N.B.—The Dominion Government contemplate the purchase of a 75 ton floating crane for St. John Harbor.

Port Arthur, Ont.—The Dominion Iron and Steel Co. will establish a line of steamers between Sydney and Port Arthur.

London, Ont.—The people will be asked to vote on the expenditure of \$75,000 to erect a breakwater, to protect west London from floods.

Sarnia, Ont.—The R. & O. Navigation Co. are extending their freight dock at Port Edward, and erecting sheds. A laundry will also be built.

New Liskeard, Ont.—Work has been commenced by J. P. Farrelly, the sub-contractor, on the new dock. About 300 piles will be driven first.

Owen Sound, Ont.—Local men will run a line of freight steamers to Fort William. Two boats will be bought by J. S. Robertson, one of those interested.

Ottawa, Ont.—The Pacific Dredging Company has been awarded the contract for dredging False Creek, Vancouver, B.C., at a price of approximately \$693,000.

Fort William, Ont.—A new and powerful ice-breaking tug is being built at the docks of the Western Drydock and Shipbuilding Co. for the Great Lakes Dredging Company.

Levis, Que.—T. Davie & Sons, are building six steel scows for the Dominion Public Works Department, and also a large hopper dredge for the Marine and Fisheries Department.

Vancouver, B.C.—The C.P.R. have given a contract for 250,000 feet of creosoted piling to the Pacific Lumber Creosote Plant at Eagle Harbor, Wash., to be used for dock extensions.

Port Huron, Mich.—Capt. J. T. Reid, of the Reid Wrecking Company, denies the rumors that the Reid interests in this city and Sarnia had been purchased by The Great Lakes Towing Co.

Toronto, Ont.—The Richelieu and Ontario Navigation Co. will build docks here costing a million dollars. A double dock will be of reinforced concrete and steel.

Fort Erie, Ont.—The town has arranged with Fix Bros., Buffalo, to run ferries after April 1. The charter of the Buffalo and Fort Erie Ferry Co. has been cancelled.

North Vancouver, B.C.—Debentures for \$155,000 will be issued for the construction of No. 4 ferry and terminals at the Vancouver side for the Vancouver Ferry Co. Mr. Kemp is secretary.

Sarnia, Ont.—For the second time this winter the heavy ice flows in the St. Clair River disabled the car ferry International of the Pere Marquette Line, which plies between Port Huron and Sarnia, on March 8.

St. John, N.B.—Because of St. John's growth, the port is to be raised to the classification of first-class, and will rank with Montreal. The Customs for the fiscal year, it is believed, will show an increase of \$300,000.

Toronto, Ont.—The city will build a light scow for diving operations, a scow for derriek work with hoisting engine, drum, pump, etc., and a pile driver. The work will be started at once in order to have these ready for the spring.

St. John's, Nfld.—While leaving the harbor for the sealing grounds, the steamers Beothic and Belleventure collided on March 13. The latter boat was so badly damaged, she had to be taken to dry dock immediately for repairs.

Montreal, Que.—The Canada Cement Company will build a 500 foot wharf at its plant at Pointe-Au-Trembles, for the purpose of facilitating the shipment of its product. The engineers employed by the Harbor Commission are now taking soundings, and it is expected that work will be completed by the fall.

Hamilton, Ont.—Judgment has been awarded E. Browne & Son, wharfingers, Hamilton, against the Canadian Lake Transportation Co., of Toronto, on the former's counterclaim. The claim was for \$3,326 for alleged breach of a five-

years' contract to bring 6,000 tons of freight yearly to the wharf to E. Browne & Son. A reference to the Master is directed to determine the amount.

St. Catharines, Ont.—Chief Engineer Weller, of the Welland Ship Canal, states that he expects that actual work will be commenced on the big undertaking during the summer, but that the exact date depends upon the government.

Vancouver, B.C.—The light being installed at Langara Island will be in operation by the beginning of June, according to Captain F. T. Saunders, head of the Digby Island marine depot. This beacon will be the most powerful light on the Pacific Coast.

Ottawa, Ont.—The Government will call tenders for the construction of ferry slips for the new car ferry service from Prince Edward Island to the mainland. The terminals will be at Cape Traverse and Cape Tormentine, and cost in the neighborhood of \$1,500,000 to \$2,000,000.

Sault Ste. Marie, Ont.—The sum of \$400,000 will be spent on the water front at Sault Ste. Marie this season in docks and terminal facilities by the Algoma Steamship Co. and the Algoma Central Railway, both subsidiary companies of the Lake Superior Corporation.

Quebec, Que.—The Quebec Harbor Commission have purchased Indian Cove, adjoining the site of the proposed graving dock. Mr. William Price, the chairman of the Commission, states that the property will be utilized in connection with the future winter navigation of the St. Lawrence.

Vancouver, B.C.—The West Vancouver Ferry Co., Ltd., recently invited tenders for the construction of one passenger vessel, 80 feet long by 15 feet 6 inches beam, and fitted with one 80 horse power Atlas Marine Engine. Messrs. Morris, Bulkeley & Halliday, Vancouver, are the naval architects.

Brockville, Ont.—The Montreal Light, Heat & Power Co.'s three-year-old steel steamer Key Storm, which sank a short distance north-west of Chippewa Point

MARINE ENGINEERING OF CANADA

in October last, after striking a shoal during a thick fog, bids fair never to be brought to the surface. Divers are convinced it is impossible to raise her.

New Westminster, B.C.—On the recommendation of the harbor committee, the tender of Messrs. Stead, Parsons & Ross for the construction of three scows at \$4,825 each, was accepted by the city council. Harbor Engineer Powell was authorized to spend \$400 per scow to make additional improvements to them.

Ottawa, Ont.—An order-in-council has been passed, giving harbormasters the right to decide where vessels carrying explosives or inflammable or dangerous goods shall moor, to load or unload. A fine of \$100 may be imposed for violation of the regulation, with \$10 more for each twelve hours of continued violation.

Vancouver.—The C.P.R. has given a contract for 250,000 lineal feet of creosoted piling to the Pacific Lumber Creosoted Plant at Eagle Harbor, Wash. These piles are to be used in the dock extension scheme and will be shipped here in consignments of 10,000 feet a week by the Washington Tug and Barge Co.

Hamilton, Ont.—The Board of Control have approved of rules drawn up by the Harbor Commission, and they will be submitted to the Government. They provide for a tariff of charges, and the regulation of speed. Rowboats and other small craft, it is provided, shall carry headlights and at least one life-buoy or belt.

Vancouver, B.C.—The steamer Congress, building at Camden, N.J., for the Pacific Coast Steamship Co., is nearly ready for launching and is expected to reach San Francisco on July 1. She will immediately begin service between that port and British Columbia. Her length is 440 feet, and she has accommodation for 400 first-class passengers.

Detroit, Mich.—Lighthouse Inspector Woodruff has issued notices to mariners that the flashlights at the Ecorse and Grassy Island South Ranges will be operated as fixed lights this season. The lights in the Livingston Channel will show one second light and one second dark. Navigators have complained against both the range and channel lights.

Navigation Opening.—Navigation will open at Fort William, Ont., on April 15 at the earliest, according to W. W. Halls, manager here of the Merchants' Mutual Line. "There is practically no ice in the lakes, but the Soo River will hold up the boats," declared Mr. Hall. On March 15, 1911, the same conditions were

in effect, but navigation did not open until April 15.

Sydney, N.S.—The Dominion Steel Corporation intends to establish a line of steamers between Sydney and Port Arthur. Two 1500 ton freighters will be put on the service shortly after navigation opens. The round trip takes about a month. Negotiations are now in progress, it is understood, for the purchase by the company of two big boats for this particular service.

Fredericton, N.B.—The Provincial Legislature has adopted the principle of financial aid to the Norton Griffiths Co. in establishing a shipbuilding plant at St. John. The Hon. W. C. H. Grimmer, Attorney-General, announces that the Canada Iron Corporation is seriously considering the removal of their foundries and blast furnaces from Londonderry, N.S., to St. John.

Quebec, Que.—The foundation work of the new grain elevator to be built by the Harbor Commission at a cost of one million dollars was started on March 11 by the Canadian Stewart Co. Piles and engines necessary for the work arrived on March 8, and a few hundred men are now engaged. The Commissioners are having a three-storey office building erected under their own supervision.

Detroit, Mich.—The new steel steamers which are building at Detroit for the George Hall Coal Co., of Ogdensburg, were launched recently. They are named A. D. MacTier and F. P. Jones. The new boats are duplicates of the Lucius W. Robinson, built for the Hall Company last year, with the exception of some features of the equipment, which will be more up-to-date. They are to go into commission some time in May.

Sarnia, Ont.—Navigation has opened on St. Clair River, although not officially announced. At six o'clock on March 14 the big new car ferry and passenger steamer St. Marie steamed past Sarnia with all flags flying, on her way from Toledo, where she but recently left the shipyards, to the Straits of Mackinac, her station. The river is free of ice from Lake Huron to Lake St. Clair, and there is no impediment to navigation.

Brockville, Ont.—The Island Belle, one of the best known craft plying the St. Lawrence between Cape Vincent and Ogdensburg, sank at her dock, Alexandria Bay, March 18. Planks crushed in by pressure of ice during the heavy storm of the previous Saturday are believed to have been the cause. The boat is lying on a rock in 35 feet of water, but should the ropes

now holding her give way there is danger of her sliding into ninety feet.

Ottawa, Ont.—A deputation, which waited on the Minister of Public Works on February 25, proposed that the Harbor of Port Dover be taken over by the Government and extended and improved. The deputation represented Port Dover and Brantford. The result of their coming is that W. P. Kellett, engineer of the Lake Erie and Northern Railway, will confer with engineers of the Public Works Department, and a report be submitted by them to the Government.

Halifax, N.S.—The Canadian Northern liner Royal Edward, Captain Wotten, from Bristol, which arrived in port late on the morning of March 12, reports having picked on the Monday previous a wireless message emanating from Poldhu, telling of the explosion at Irvine, Scotland. When the message was picked up, the Royal Edward was two thousand miles from the English coast. This constitutes a record for this ship, and possibly for transatlantic navigation.

Sarnia, Ont.—It took the Reid Wrecking Company, of Sarnia, less than a week to float the steamer Manitou, which, after she was burned, sank in the harbor of Owen Sound. The Manitou was down in twenty feet of water. Diver Myers battened every opening, sheeted her with oil canvas and put powerful pumps to work. The boat is now moored to the dock, and is on an even keel. Repair work will be pushed so as to have her ready for the opening of navigation in the spring.

S. S. Marie, Ont.—The warm sun of the past few days has played havoc with the ice in the St. Mary's River, and an early opening of navigation is anticipated. There is the greatest activity at the locks, the work of generally overhauling the equipment being in progress. The dredging operations will be continued at the earliest possible date, and a sum of \$400,000 will be spent on the waterfront on docks and terminal facilities by the Algoma Steamship Co. and the Algoma Central Railway.

The Niagara Raised.—Working in one of the worst blizzards of the Winter, near Erie, Pa., a local contractor and his gang, on Mar. 6, raised the Niagara, Perry's flagship, in the Battle of Lake Erie, September 10, 1813. A crowd of half rozen curio seekers were held back with difficulty when the gun parts became visible. She will be floated to a local shipbuilding yard, where she will be overhauled preparatory to her last cruise along the Great Lake ports from Erie to Duluth during the Perry centennial celebration next summer.

The Interstate Board of the Centennial Commission is in charge of the work.

Montreal, Que.—The Lachine Canal was emptied of its water at noon on Saturday, March 22, as a preliminary to the cleaning and repairing of the waterway before the opening of navigation. The canal will be closed and dry until after the 22nd of April.

Brockville, Ont.—After being out of commission for forty days, the steamer Bigelow resumed the ferry service between here and Morristown, N.Y., on March 20, thus establishing a record for late and early navigation on this part of the St. Lawrence. The Bigelow did not tie up until February 8.

Toronto, Ont.—The Toronto Ferry Co. had the Clark Bros. ferry in commission on March 10 for the first time this season. She crossed from the Bay Street dock to Hanlan's with little loss of time early in the forenoon, and repeated the trip several times later in the day.

Washington, D.C.—The United States Government will probably not patrol the North Atlantic steamship lane for icebergs in view of the action of the British Board of Trade and British steamship interests in sending the whaler Scotia for that purpose.

Kingston, Ont.—The ice in the harbor was rent asunder on March 21 by a terrific gale, and ferry steamers are now crossing between the islands and the city. Last year the harbor was not open until April 17. The present opening is the earliest for at least twenty years. Navigation closed here on the 4th of February.

Allan Liner "Alsatian."—The new Allan Line steamship "Alsatian" was launched from the shipyard of William Beardmore & Co., Ltd., at Clydebank, Scotland, on Saturday, March 22. Reference was made to this vessel in a previous issue, and it will be remembered that she is intended for the company's service between Liverpool and Montreal.

Quebec, Que.—The St. Lawrence River below Three Rivers is free from ice with the exception of battures inshore. The Lady Grey has been eminently successful in keeping the narrow channel at Cap a la Roche open during the winter, and she will now devote attention, assisted by other ice breakers, to securing an entirely free and unimpeded passage below Three Rivers for the ice as soon as it commences to go out.

Halifax, N.S.—Word was received in Halifax on the morning of March 15 that the steam sealer Lloydsen, Captain

Barber, while endeavoring to force its way through the ice at Port Au Basques, struck a sunken rock, with the result that the vessel was so seriously damaged as to make necessary the abandonment of the voyage. The SS. Labrador, Captain Daniel Martin, also of the Gulf fleet, sprang a leak while in the heavy ice, and had to be beached in St. Mary's Bay. This leaves but four steamers in the Gulf sealing fleet. The steamers Beothic and Bellaventure, while sailing from St. John's on Thursday, collided.

Sarnia, Ont.—The respective appointments for captain and chief engineer of the Northern Navigation fleet have been announced:—

S.S. Hamonic—Captain, R. D. Foote; chief engineer, James Wilson.

Huronic—A. L. Campbell, Frank T. Norris.

Saronic—A. M. Wright, E. H. Spencer.

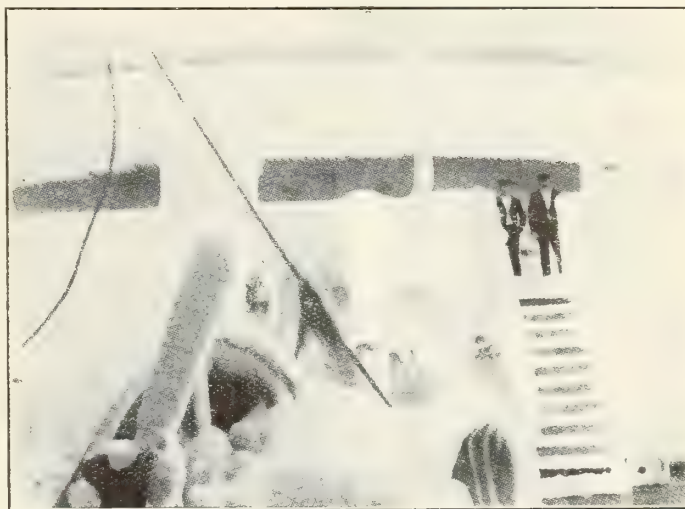
been in the dredge contracting work for the past fifteen years, and have had the contracts for much of the river improvement work that has been done in this vicinity.



CHANGES IN LIGHTING ON GREAT LAKES.

MANY improvements will be made in the lighting systems along the Great Lakes this year, and the work will be commenced as soon as the weather and ice conditions permit. All the lights now at the West Neebish and Middle Neebish Channels and the Hay Lake Rangers at the Soo, are "attended" lights, and will be changed to "unattended" or automatic lights. The appropriation for the work was made some time ago, and the job will be commenced on the opening of the season.

Several alterations are to be made in the lights of the lower Detroit River



A FROST EFFECT ON THE "ROYAL EDWARD"

The picture shows the bridge as it appeared when the ship was passing Cape Race on 1st.

Doric—Samuel Hill, James Cameron.
Ionic—Robert Laing, James Adams.

Germanic—F. G. Mole, S. Burgess.

City of Midland—Charles Hill, J. Osborne.

Waubie—Captain, W. Kinnee.

Sault Ste. Marie, Ont.—A deal has been consummated whereby the Great Lakes Dredge & Dock Co. takes over the entire equipment of the Edward Bros. Dredge Co. The amount involved in this deal was in the neighborhood of \$280,000. The equipment, which Edward Bros. sold, consists of the tugs James Edward and Hassayampa, the dredges Majestic, Nos. 1 and 2, drill boat No. 1, a quarter boat, eight dump scows and three flat scows. This, the Great Lakes Dredge & Dock Co. will add to their other equipment of this kind, which will make their outfit the most complete of any in this vicinity. Edward Bros. have

this year. The South Grassy Island and the Ecorse Range lights, which have heretofore been flashing, will be changed to fixed lights, and the Livingstone Channel buoys, which have been flashing every three-tenths of a second, will be changed to flashes of one second.

For several years mariners have complained of the flashing lights at the lower river ranges, and masters who passed through the Livingstone Channel last season complained of the blinking buoys there. These changes in the lower river will be made before the opening of navigation. A new buoy will be placed to mark the head of Stag Island, below Sarnia.



Everyone must see daily instances of people who complain from a mere habit of complaining.

Men in Command and Their Vessels, Navigation Season, 1913

With the near approach of the opening of navigation on our Canadian lakes and rivers, steamship companies are taking steps towards the fitting-out of their various craft, and placing on record the chief appointments to the bridge and engine room. There is appended herewith the list available as we go to press.

St. Lawrence and Chicago Steam Navigation Co.

Vessel.	Master.	Engineer.
James Carruthers	W. H. Wright	E. J. O'Dell
E. B. Osler	John Williams	Charles Robertson
W. D. Matthews	Peter J. Shaw	William Harwood
G R. Crowe	C. E. Robinson	Wallace Robertson
Iroquois	H. Hudson	William Reid

Mathews' Steamship Co.

Vessel.	Master.	Engineer.
Edmonton	Henry Maitland	J. G. Fisher
Haddington	T. H. Johnson	D. McKenzie
Yorkton	J. Cavanagh	J. E. Readman
Easton	D. N. Laroche	William Whipps
Masaba	J. A. Smith	

Merchants' Mutual Line

Vessel.	Master.	Engineer.
Canadian	W. H. Anderson	R. McLaren
Acadian	R. McIntyre	J. S. Duguid
Hamiltonian	A. B. McIntyre	A. E. Kennedy
Fordonian	H. W. Larush	Wm. Gronning
A. E. McKinstry	A. E. Stinson	A. C. Leitch
D. A. Gordon	R. F. Pyette	Geo. D. Adams
Renvoyle	H. Redfern	A. McLaren
Calgarian	Peter McKay	Andrew L. Black
Tagona	J. S. Moore	W. H. Taylor
Regina	E. H. McConkey	C. J. McSorley
Kenora	Wm. Brian	Wm. Byers
Cadillac	T. D. Sullivan	W. Norcross
Pioneer	W. H. Montgomery	W. A. McLaren
Chili	Geo. H. Page	D. W. Rice
Mars	J. F. Davis	Jos. McLeod
Saskatoon	H. J. Aitken	John G. McHattie
Beaverton	J. E. Mann	H. Myler
Mapleton	A. Patenaude	F. A. McCaulay
A. E. Ames	D. Chambers	L. McMillan
H. M. Pellatt	N. McKay	William Harmon
J. H. Plummer	W. O. Zealand	R. Chambers
Turret Court	N. Barrett	H. C. Harrison
Turret Cape	D. P. McCarthy	A. E. House
Turret Chief	Thos. Padjington	J. J. Dove
Scottish Hero	R. D. Simpson	H. Macdonald

Inland Lines, Limited

Vessel.	Master.	Engineer.
Emperor	Geo. W. Pearson	George Smith
Midland Prince	Jas. Tindall	James Pickard
Midland King	Wm. Cunningham	James McGregor
Midland Queen	Wm. Lavigne	Frank Goodwin
Stadacona	Jas. Cannally	Geo. Laird
Empress of Midland	Jas. Wilson	Jno. Dee
Emp. of Ft. William	Dave Burke	Jno. Murphy
Glenellah	Geo. MacKay	W. McWilliams
Dundee	Jas. Woolner	Ed. Shaw
Dunburn	C. R. Albinson	Sylvester Murray
Donnacona	Robt. Alexander	Fred Wilson
Strathcona	Con Dineen	James Payne

Vessel.	Master.	Engineer.
Winona	Ben Garvie	Chas. M. Arnot
Rosedale	W. Rewitt	Hugh McWilliams
Waheondah	W. Linton	Joe. Kennedy
Neepawah	W. W. Allen	James Carr
Dunelm	Robt. Cooney	George Wilson
Majestic	Wm. Cox	D. S. La Rue

Niagara, St. Catharines and Toronto Line

Vessel.	Master.	Engineer.
Dalhousie City	J. W. Maddick	Jas. H. Brown
Garden City	George Blanchard	Mr. Welch.

C. P. R. Lake Vessels

Vessel.	Master.	Engineer.
Keewatin	M. McPhee	Wm. Louis
Assiniboia	Louis Pyette	Angus Cameron
Manitoba	R. McIntyre	Wm. Aston
Alberta	Frank Davis	Chas. Butterworth
Athabasca	James McCannell	Wm. Lockerbie

Richelieu and Ontario Navigation Co.

Vessel.	Master.	Engineer.
Kingston	E. A. Booth	J. W. Hazlett
Toronto	C. E. Redfearn	W. Chipman
Rochester	Jas. Owens	J. M. Cummings
Rapids King	.. .. .	.. .. .
Rapids Prince	Geo. Batten	D. J. Leslie
Rapids Queen	J. P. Stephenson	A. Charbonneau
Montreal	F. X. Lafrance	Geo. Gendron
Quebec	L. R. Demers	A. Ouzilleau
St. Irene	Jos. Dugal	G. Gagnon
Tadousac	Jos. Simard	M. Latulippe
Murray Bay	W. Gagne	A. Gendron
Saguenay	Chas. Koenig	N. Beaudoin
Belleville	Wm. Bloomfield	J. Boisvert
Berthier	C. Laviolette	T. Matte
Three Rivers	A. Mondor	C. Gendron
Beaupre	.. .. .	.. .. .
Boucherville	A. Laviolette	C. Hamei
Longueuil	H. Mandeville	H. Noel
Pandora (tug)	.. .. .	.. .. .
Cayuga	C. J. Smith	A. J. Woodward
Chippewa	W. Malcolm	H. Parker
Ongiara	.. .. .	.. .. .
Chicora	Thos. Allen	N. Griffin
Corona	B. A. Bongard	J. Findlay
Modjeska	P. Walsh	A. Flumerfeldt
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America
New Island Wanderer

Ramona
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Pierrepont
St. Lawrence
Jessie Bain

Appointments
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Made.

ICE OBSERVATION VESSEL FOR NORTH ATLANTIC.

SOME further particulars have been supplied us from an official source, says "Syren and Shipping," respecting the vessel which the British Government and the principal Atlantic lines have arranged to provide between them to survey the ice regions of the North Atlantic and to furnish navigators with information concerning the movement of bergs. It appears that the vessel, of which we give a picture, has been chartered by the Liverpool Steamship Owners' Association for the Board of Trade, and the former organization will provide the crew, victuals and bunkers. The services of the Meteorological Department have been secured in connection with the scheme, and Commodore Hepworth, the Marine Superintendent, has undertaken to circulate all the information received and likely to be of use to those in charge of steamers.

Captain Robertson, the commander of the ice observation vessel, has, we are informed, been instructed to take his ship, the Scotia, up certain sections of the coast of Newfoundland and Labrador, where observations will be made as to the salinity and temperature of the water, the depth of the currents, their extent generally, and their direction and rate of progress. The effects of this new departure will undoubtedly

be far-reaching, and we have authority for saying that further important developments of the work will ultimately take place. There is, for instance, a great deal yet to be learned with regard to the movement of ice; how it grows; where it breaks away from the glaciers; and then, of course, its final movements



ICE OBSERVATION STEAMER "SCOTIA."

when it gets down into the Gulf Stream. The newly-acquired vessel, a Dundee whaler, after being dry-docked, opened out and surveyed by Board of Trade surveyors, is now on her station.

Capt. C. H. Nicholson, manager of the Grand Trunk Pacific Steamship Co.,

reports that the steamer Prince Albert has been withdrawn from the service for the purpose of installing oil fuel apparatus similar to that already installed in the Prince Rupert and Prince George, and will be out of commission until further notice.



Knots, Splices and Rope Work, by H. H. P. Verrill, editor of the Popular Science Paper, of the "American Boy Magazine," 150 illustrations; 60 cents: The Norman W. Henley Publishing Co., New York. Doubtless the trailing vines and plants first suggested ropes to human beings, and it is quite probable that these same vines, in their various twistings and turnings, gave man his first idea of knots. Mr. Verrill tells of the utility of knots in this volume. A little knowledge of knots has saved many a life in storm and wreck, he says, and if every one knew how quickly and securely to tie a knot, there would be far fewer casualties. The information given should be of value to engineers.

T. B. F. BENSON

(Assoc Inst N. A.)

NAVAL ARCHITECT.

All types of vessels designed and construction superintended.

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ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

William Lahey, for sixty years a pilot at St. John, N.B., died on March 13, aged ninety.

Thos. Gilbert, one of the leading old-time shipowners of St. John, N.B., died March 11, aged 92.

William Russel, of Seal Cove, Grand Manan, N.B., has been appointed harbor master for the Port of Seal Cove.

Henry W. Smith, of Sambro, N.S., has been appointed harbor master of the Port of Sambro, in place of Simon L. Gray.

Captain James McAllister, of Fort William, Ont., has been appointed sub-agent of the Department of Marine and Fisheries at Fort William, Ont.

Henry John Farmer-Atkinson, founder and first President of the Chamber of Shipping of the United Kingdom, died March 3, at the age of eighty-five.

E. W. Holton, formerly eastern passenger agent Nor. Nav. Co., has been promoted to the position of general passenger agent with headquarters at Sarnia.

Robert Reford, president of the Robert Reford Co., Ltd., died on Saturday morning, March 15. He was 82 years of age, and had been in delicate health for several months.

Sir Archibald Lucius Douglas, K.C.B., died on Tuesday, March 11, at Newham, Hants, in his 71st year. He had served as Lord of the Admiralty, A.D.C. to Queen Victoria and was formerly Commander-in-Chief of the North American and West Indian stations. He was born in Quebec in 1842, and served in Canada in 1866, and the Soudan in 1884. One of his important missions was as Chief of the Commission in 1873 to instruct the Japanese Navy.

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

R. V. Robinson has been appointed to the position of general freight agent, in charge of the claims and freight traffic of the Northern Navigation Co., with headquarters at Sarnia. Mr. Robinson was formerly eastern freight agent of the company.

Frederick S. MacGreggor, traveling passenger agent of the Allan Steamship Line, with offices at 77 Yonge Street, was drowned while bathing on February 25, at Nasseau, British West Indies, where he had gone a few days ago on a holiday trip.

A. F. Dion, on the occasion of his departure from the C.N.R. freight department, Montreal, to take the position of harbor traffic manager at Quebec, was presented with an illuminated address, a seal traveling bag, and a set of cut glass for Mrs. Dion.

Patrick Shea, of Toronto, died on Monday, March 10, while eating his dinner. He was for several seasons in the wheelhouse of the old Southern Belle which used to run between Toronto, Niagara and Hamilton thirty years ago, as an excursion steamer.

Captain John L. Baxter is to take command this year of the Government steamer La Canadienne. Capt. Alex. Brown of Owen Sound was in charge of the trim little vessel last year, while Capt. Baxter he was in charge of the Forest City at Fort William.

W. E. Bishop, one of the best known steamboat men on the inland lakes, and superintendent of the Richelieu & Ontario Navigation Co., at Hamilton, has forwarded his resignation to the headquarters of the company at Montreal. Mr. Bishop is going into business at Hamilton.

J. Ritchie, general freight agent of the R. and O. lines for Western On-

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.

President—James Playfair, Midland; **Council**—F. King, Kingston, Ont.

GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

Chairman—W. F. Wasley, Gravenhurst, Ont. **Secretary**—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.

President—A. A. Heard, Albany, N.Y. **Secretary**—M. R. Nelson, New York.

THE SHIPPING FEDERATION OF CANADA

President—A. A. Allan, Montreal; **Manager and Secretary**—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; **Grand Secretary-Treasurer**—Capt. H. O. Jackson, 376 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

James T. McKee, 268 Douglas Avenue, St. John, N.B., **Grand President**. **Thos. Theriault**, Levis, P.Q., **Grand Vice-President**.

Nell J. Morrison, P.O. Box 238, St. John, N.B., **Grand Secretary-Treasurer**. **Jno. A. Murphy**, Midland, Ont., **Grand Conductor**.

George Bourret, Sorel, P.Q., **Grand Doorkeeper**.

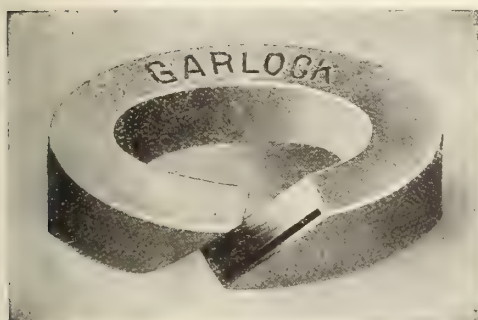
Richard McLaren, Owen Sound, Ont. **L. B. Cronk**, Windsor, Ont. **Grand Auditors**.

Directory of Subordinate Councils for 1913.

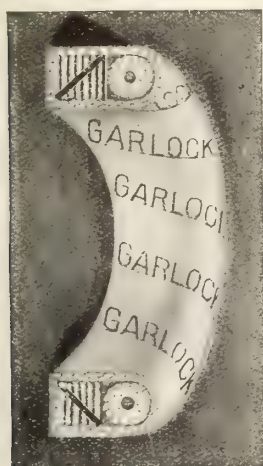
Name.	No.	President.	Address.	Secretary.	Address.
Toronto.	1	A. J. Fisher,	490 Concord Ave.	E. A. Prince,	61 Elm Grove, Toronto.
St. John,	2	J. F. Matthews,	50 Douglas Ave.,	G. T. G. Blewett,	65 Harrison St., St. John, N.B.
Collingwood,	3	Andrew Kerr,	Box 343, Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood.
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3208 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex. McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	A. S. DeGruchy,	Room 23, Williams Bldg.,	E. Read,	859 Thurlow St.
Levis,	8	Helaire Mercier,	Bienville, Levis,	S. G. Guenard,	Bienville, Levis, P.Q.
Sorel,	9	Geo. Bourret,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	H. W. Fletcher,	636 4th Ave. East,	E. J. Riley,	1030 1st Ave., Owen Sound, Ont.
Windsor,	11	Alex. McDonald,	Windsor, Ont.,	Neil Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,	Midland,	Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault Ste. Marie,	14	Thos. O'Reilly,	Sault Ste Marie,	Geo. S. Biggar,	Sault Ste Marie, Ont.
Charlottetown,	15	J. K. Sutherland,	Charlottetown, P.E.I.,	Lem Winchester,	302 Fitzroy St., Charlottet'n, P.E.I.
Fort City.	16	Arthur Abbey,	Fort William, Ont.	John A. Smith,	Fort William, Ont.

Garlock Marine Packings

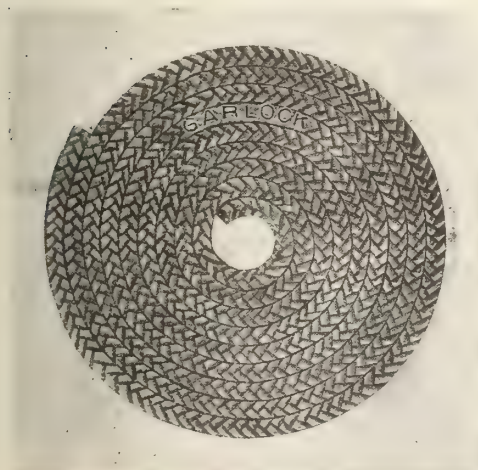
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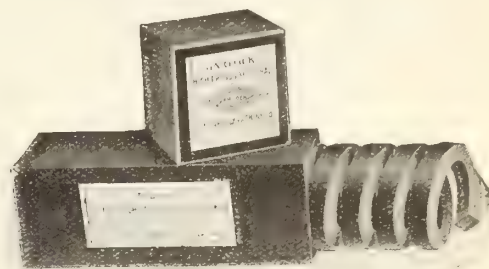
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Hamilton



BRANCHES:

Montreal Toronto
Winnipeg
Vancouver



Garlock High Pressure Spiral



Garlock Low Pressure Diagonal



Garlock Gum Gore

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tario, has tendered his resignation, to take effect on April 1. Mr. Ritchie is returning to Boston, to enter the service of the Canada-Atlantic Railway, with which he was connected before coming to Toronto.

Captain Chas. T. Deakin died at Rednersville, Ont., from heart failure, on Sunday, March 9. He was a native of Digby, N.S., and had followed the sea for many years. He was appointed captain of the Government steamer *Lansdowne* and sailed in charge of her for some years out of St. John, N.B.

William B. Hines, formerly western baggage agent of the Richelieu and Ontario lines, has been appointed superintendent of the docks of the company in Toronto. Mr. Hines was with the Niagara Navigation Co. for several years, and during the winter months acted as a baggage agent for railway in Florida.

Alex Lewis, secretary of the Toronto Harbor Commission, has left for a six week's trip to the ocean and inland ports of the United States, with the object of studying how these are governed by the Harbor Commissions of the Republic. Upon his return it is understood he will draft regulations by which traffic in and out of the port of Toronto will be directed.

Captain J. D. Weir has been appointed superintendent of construction and of lights under the Montreal agency of the Marine and Fisheries Department. The appointment which was made by an Order-in-Council, is a popular one with the local departmental officials, owing to Captain Weir's long experience in the work which is now being entrusted to his charge. He joined the service in the year 1906, and from 1909 till 1911 was acting assistant to the superintendent in charge of the lights being confirmed as such in 1912, and remaining as assistant-superintendent until now, when he will take over the full responsibilities.

THE MONTREAL DRY DOCKS AND SHIP REPAIRING CO.

THIS corporation, of which Mr. J. T. Walsh is President and Mr. Thomas Hall, managing director, was organized in 1912 and is now operating a commodious dry dock situated at the foot of Mill Street, Montreal, at the entrance to the Lachine Canal.

The dock is 400 ft. long and 47 ft. wide, with a depth of water over the sills of 10 ft. 6 in., enabling a boat of full Welland Canal size to be readily accommodated. In fact it is possible to take in two such boats simultaneously, since there is a large rectangular basin at the upper end of the dock.

Since May, 1912, the dock has been piped for compressed air, there being a full equipment of modern pneumatic tools. An up-to-date boiler shop has also been erected on the site, fitted out with all modern tools, including air compressor, punches, shears, rolls, etc., all of which are motor-driven.

About 100 men are employed and the company have a large amount of work on hand at the present time, their contracts running into many thousands of dollars.

CAR FERRY FOR THE ST. LAWRENCE.

THE National Transcontinental Railway officials have just placed an order with Cammel, Laird & Co., Birkenhead, England, for a combined steam car ferry and ice breaker. This will be used for transporting the Grand Trunk Pacific trains across the St. Lawrence pending the completion of the new Quebec bridge.

SPIDERS CONTRIBUTE TO PANAMA CANAL CONSTRUCTION.

A NUMBER of spiders at the Gorgona shops are contributing their little share to the construction of the Panama Canal. They are carefully protected in the instrument room, because, from their cocoons, the instrument makers procure filaments for use in the transits of the surveyors. In the microscopes of the transits are very fine threads by means of which the surveyor determines when his instrument is centred upon an object. This thread is of platinum when the instruments are new, but when it has worn out and must be replaced, the instrument repair men at Gorgona have been using the thread taken from the cocoon of a certain variety of spider which has been encouraged to multiply in the instrument shop for the past seven years. This use of the filament from the cocoon is of course not original on the Isthmus.

It has been found that when the instruments so repaired are used early in the morning or during a rain, the thread does not remain taut, because the instrument itself contracts. As soon as the instrument warms up, however, the spider web answers it purpose very well. In order that there may be no time of the day in which the transits may not be used, an order has been placed for platinum thread. When this arrives on the Isthmus, the use of the spider web will be discontinued, and the Canal force will be reduced by at least half a dozen more workers, for there are at least that many spiders spinning fiber at the Gorgona Shops.

S. S. MANITOU IS FLOATED.

IT took the Reid Wrecking Co., of Sarnia, less than a week to float the steamer *Manitou*, which, after she was burned, sank in the harbor of Owen Sound. The *Manitou* was down in twenty feet of water. The modus operandi of her salvage was very simple. Diver Myers battened every opening, and sheeted her with oil canvas, after which powerful pumps were put to work. She is now moored at the dock, and is on even keel. When the insurance valuers have made an estimate of the loss, the work of repair will be pushed so as to have her ready for the opening of navigation in the spring.

GILCHRIST FLEET AUCTIONED.

THE 48 vessels comprising fleets of the Gilchrist Transportation Co., operating on the Great Lakes, were sold at auction by Receiver S. P. Shane in federal court, Cleveland, Ohio, on March 6. The sale netted \$3,500,000. Stockholders will realize nothing, as claims against the company exceed the proceeds of the auction. Bankers holding mortgages bid in most of the vessels at two-third valuation.

GRAIN SHIPMENTS AHEAD OF LAST YEAR.

THE Canadian Pacific Railway has given out official returns of wheat marketed over their lines from September 30, 1912, to January 25, 1913. An increase of over 30 per cent. over last year in the gross amount of wheat marketed is shown, and an increase of nearly one hundred per cent. in other grains. This season, 81,747,000 bushels of wheat and 28,126,000 bushels of other grains were marketed, as compared with 61,740,000, and 14,388,000, respectively, last year. This season's shipments consisted of 41,877 cars of wheat and 14,105 cars of other grains to the elevators and 11,147 cars of wheat and 3,948 of other grains shipped direct. The totals show 71,077 cars of grain this year and 48,379 last.

Sir William H. White, formerly chief constructor of British Navy, died on February 27, at London, as the result of a stroke of apoplexy. Sir William was a frequent visitor to this continent. He was a self-made man in every sense of the word, starting his career in the naval dockyard at Davenport as a shipwright apprentice, and rising rapidly until he became practically sole designer of the warships of the British Government. He was responsible for the designs of all the war vessels launched in Great Britain between 1885 and 1900.

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Builders of Wood and Steel Passenger Steamers, Tug, Steam and Gasoline Engines of all Descriptions.

Send for new catalog. Ready March 1st.

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Also Rubber Goods, Hose, Etc.
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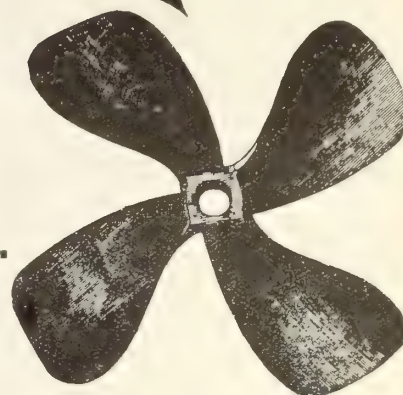
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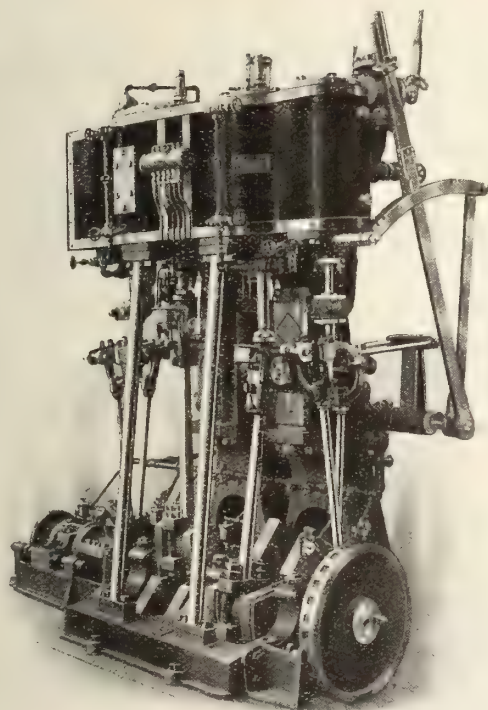
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Work that would take weeks to do by hand, done in a few hours. Satisfac-
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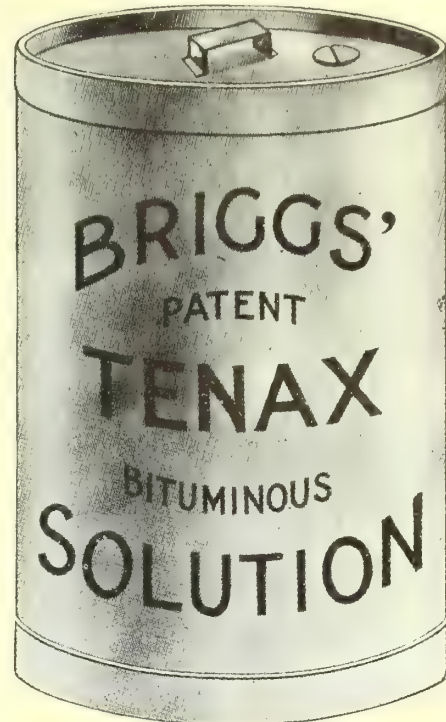
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In all its branches. We have a complete stock, consisting of Marine Hardware, Lamps, Anchors, Compasses, Logs, Nautical Instruments, Wire and Manilla Rope, Capstans, Chain, Waste, Marine Plumbing Outfits, Oakum, Caulking Cotton, Oiled Clothing, Life Jackets, Sails, Flags, Canvas work.

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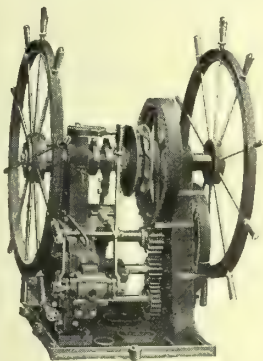
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The World's Record Anti-Corrosive.



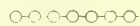
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Steam Steerers for Tugs and Steamers. Single or double wheel.

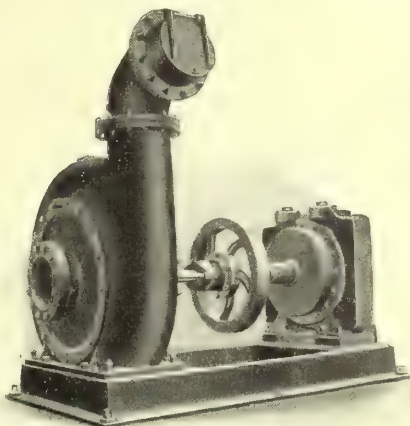


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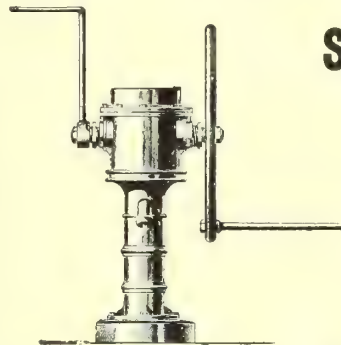
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Collingwood, Ont., Canada



Canadian Government Steamer "ESTEVAN"—212'-200' x 38' x 17'-6.

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**Steel and Wooden Ships, Engines, Boilers,
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A monthly journal dealing with the progress and development of Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks, and containing a record of the latest and best practice throughout the Sea-going World. Published by
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Vol. III.

Publication Office, Toronto—April, 1913

No. 4

POLSON IRON WORKS, LIMITED **TORONTO - - CANADA**

Steel Shipbuilders
Engineers and Boilermakers



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Steel Vessels, Tugs, Barges, Dredges and Scows
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Of the S.S. "IMPERATOR" 50,000 Tons.

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SPECIFY AND INSIST ON GETTING **BRIGGS'**

THE TWO LARGEST LINERS IN THE WORLD

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ENAMELS AND SOLUTIONS

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Agents for Canada:
MACDONALD & SONS, 176 King St. East, TORONTO.

Dipper Dredges Clam Dredges Steel Scows Drill Boats



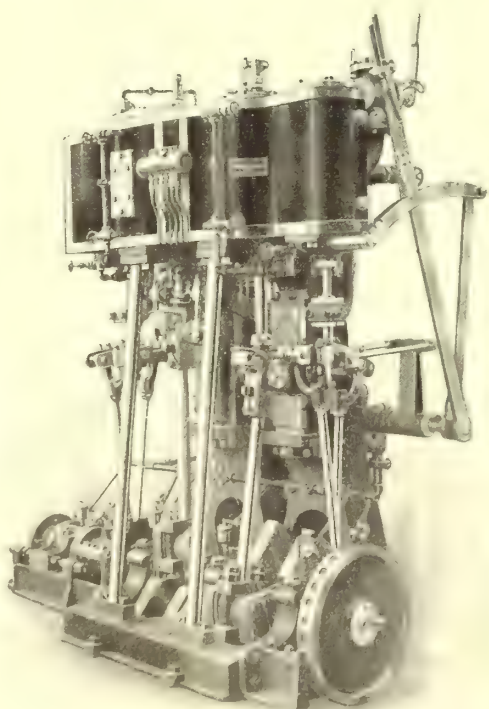
Equipment of this nature together with Hoisting Engines of all kinds are specialties with us.

Let us figure on your requirements.

We have the experience necessary to build anything you need in this line and you will find our prices right.

Send for descriptive matter now.

M. BEATTY & SONS, Limited
WELLAND ONTARIO



This is one of our Compound Jet Condensing Engines with Pumps and Thrust attached.

The Doty Marine Engine & Boiler Co., LIMITED

Builders of

High Grade Marine Engines & Boilers

Compound Jet Condensing Engines

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Tandem Compound Stern Wheel Engines

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Estimates furnished for complete Marine outfits.

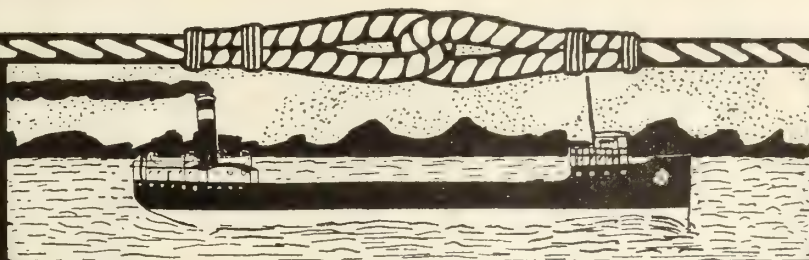
The Doty Marine Engine & Boiler Co., LIMITED

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SHIP CHANDLERY



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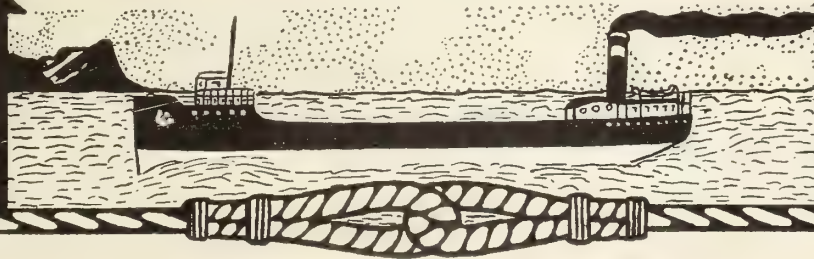
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TORONTO: Head Office.

Lock 24 Welland Canal, THOROLD, ONT.

Highest Quality Marine Engineers' Supplies,

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Electric Deck Light,
Heavy Type.



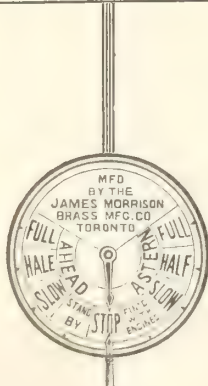
Marine Folding Lavatory.



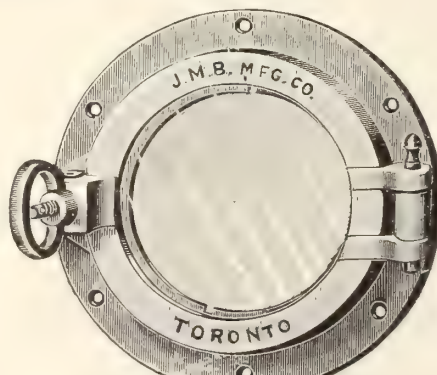
Marine Closet with Pump Attachment.

We have had many years' experience in the manufacture of these lines, and we produce nothing but what has been proved efficient, durable and absolutely satisfactory in every respect.

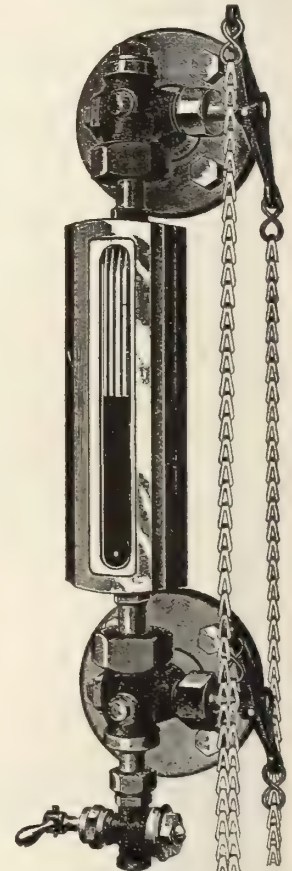
Your inquiries will receive our prompt attention.



Steamship Telegraph Signal,
Repeating Type.



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Made in different types and sizes from
5 inch to 10 inch diam.



Klinger Type Water Gauge
Mounting with Reflex Glass
—non-breakable.

The James Morrison Brass Mfg. Co., Ltd.

93-97 Adelaide St. West, TORONTO

The advertiser would like to know where you saw his advertisement—tell him.

Canadian Pacific Railroad Co. R.M.S. "Empress of Russia"

The Empress of Russia and her sister vessel the Empress of Asia have attracted considerable attention in shipbuilding and marine engineering circles by reason of the innovations which they embody; the details here given, for which we are indebted to the "Journal of Commerce," will, therefore, be of more than passing interest to our readers.

THE Canadian Pacific Railway Co.'s R.M.S. Empress of Russia is now on a "round-the-world" cruise prior to taking up her station on the Vancouver-Yokohama-Hong Kong mail service.

Externally she presents an exceptionally handsome appearance, and her great white-painted hull, with three massive yellow funnels and Admiralty stern, give her a "Government-owned" look, which adds greatly to the effect. The "cruiser" or "Admiralty" stern is quite an innovation for the merchant service, but there seems every prospect of its adoption pretty generally for the mail boat class of liner. Special advantages in regard to increased deck space and navigation are claimed for the new shape, and four liners will be equipped with it during the present year, viz.:—The Empress of Russia, Empress of Asia, and the two large quadruple-screw Allan liners Alsatian and Calgarian. Internally the Empress of Russia is scarcely less remarkable. Those responsible for her design have introduced with great advantage several new features, and the dining-room is very hand-

some. She with her sister ship will set an entirely new standard of comfort and luxury in Transpacific travel.

General Features.

The Empress of Russia is about 590 feet in length, 68 feet in breadth, and 46 feet in depth, and of about 15,000 tons gross, whereas the vessels presently conducting the service are of about 6,000 tons gross. The new boat is propelled by four screws, driven by four sets of Parsons turbines, and steam is supplied by an installation of ten boilers, working under Howden's system of forced draught at a steam pressure of 190 lbs. per square inch. A departure from current practice has been made in deciding to construct the vessels with cruiser sterns and rudders entirely underhung. This form of stern, besides giving the vessel a distinctive appearance, increases the effective length of the water line, and so assists propulsion, and adds considerably to the available areas at the after end.

The vessel has a double bottom, orlop, lower, main, upper and shelter decks,

and a straight stem. Above the shelter deck is a long combined forecastle and bridge, the bridge deck being extended to the stern on side stanchions. Above the bridge deck is a promenade deck, about 350 feet long, on which are the principal first class public rooms, with the officers' quarters and navigating bridge over. There are two pole masts and three funnels. In order to ensure safety in the event of collision or grounding, the hulls are sub-divided by numerous watertight bulkheads, closely spaced, one effect of which will be that any four compartments can be open to the sea or flooded, and the vessel will still remain afloat. The Empress of Russia and her sister ship, the Empress of Asia, have been constructed under the supervision of Lloyd's Register, and will be classed 100 A1, three deck and shelter deck, with freeboard restricted to conform to the bulkhead spacing.

Passenger Accommodation.

The vessel has accommodation for 200 first-class, 100 second-class Asiatic, and for 800 third-class Asiatic passen-



CANADIAN PACIFIC RAILROAD CO. ROYAL MAIL PACIFIC LINER "EMRESS OF ASIA," SISTER VESSEL.

MARINE ENGINEERING OF CANADA

gers, and will have a total complement of 475 officers and crew. The hold, orlop, and lower decks beyond the machinery spaces are arranged to carry general cargo. On the main deck forward, the mail room is fitted the full breadth of the ship. There are also spaces for portable steerage or cargo. Amidships on this deck are stowed the ship's stores and cold chambers. Aft this is accommodation for stewards and firemen. Between the firemen's quarters and the stern, provision has been

number of electric lifts have been erected between the main kitchens and the various stores, and a number of "deck" pantries installed on the bridge and promenade decks above. Indeed, the culinary department has received the most careful consideration, and everything possible has been done to make it efficient. The first and second-class kitchen is fitted with a large central range, silver grills, steam stockpots, bain maries, hot closets, electrically driven roasters, potato peeling machines,

Within easy reach of their cabins on the upper deck, and leading direct to a covered promenade on the shelter deck, is a second-class entrance and lounge, which in turn leads to the second-class saloon. These rooms are fitted in a large airy deckhouse about 50 feet long, 48 feet wide and 9 feet high, lit off three sides by large plate glass windows. At the aft end of the shelter deck, isolated from the first and second-class, a large covered airing space for Asiatic steerage has been provided. The hospitals, laundry, embalming-room, etc., are at the extreme aft end of the ship on the shelter deck.



C. P. R. PACIFIC LINER, "EMPRESS OF RUSSIA."

made for carrying valuable cargoes of silk. Five hundred Asiatic steerage passengers, in suitably divided compartments, having large airing and dining accommodation, ample cooking and pantry space, and commodious wash places, are arranged for on the upper deck aft and amidships on the port side.

On the starboard side aft of amidships, staterooms for four persons have been fitted up for second-class passengers. Forward of these on the same side are a number of rooms for first-class passengers. The upper deck forward provides the accommodation for seamen and petty officers. On the shelter deck, just forward of amidships, is situated the first-class reception room and cafe, measuring 44 feet by 64 feet, with large embarking gangways on either side of the ship. Access to all the first-class accommodation and public rooms is gained from this reception room. Immediately forward on this deck are large staterooms for two and three persons. Adjoining the cafe on the aft side is the main saloon, 74 feet long and 64 feet wide, lit from the sides by a number of beautifully designed windows nearly five feet wide, and from above by a large well, 26 feet by 16 feet wide. The tables are arranged to suit the demands of various passengers, from small tables for two and four persons, to semi-private tables for six, arranged in alcoves, and larger tables for larger parties.

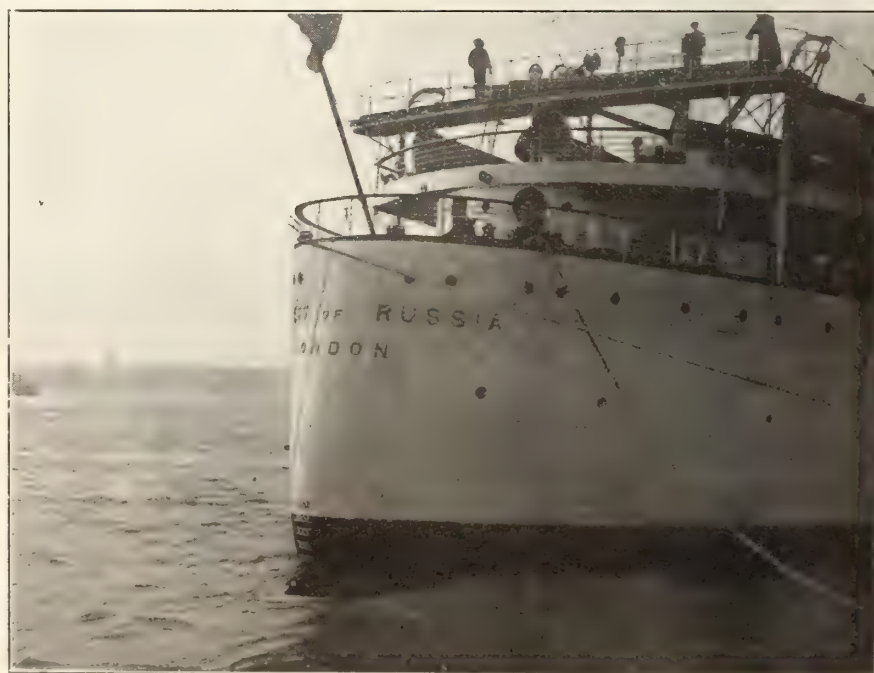
In the central part of this deck is fitted the main kitchen, the pantries, cold larders, bakery, etc., equipped with all latest hygienic and labor-saving devices necessary for effectively serving the first and second class passengers. To minimise running to and fro, a

and every conceivable labor-saving device.

The bakery is fitted with watertube ovens of the latest type, and the baker's shop contains dough-mixing machines, ice cream machines, and refrigerators. The pantries for first, second and third-class passengers are completely fitted with carving tables, bain maries, coffee and water boilers, egg boilers, and electric hot plates. Aft the galley and adjoining the turbine hatch, within easy reach of the promenade on the shelter deck, are the engineers' quarters, so arranged as to give the maximum comfort to the engine-room staff in hot weather.

Ascending the grand staircase from the reception room, the first-class state-rooms on the bridge deck are reached. These rooms are enclosed in a complete steel deckhouse 340 feet long; each measuring 10 feet by 9 feet, with sleeping berths for two persons, and a couch so arranged as to be easily converted to a bed should it be found necessary. The sleeping berths, again, are so designed that should one passenger only engage the room, all evidence of the other berth is hidden leaving only a single brass bedstead. Another feature is that two state-rooms can be converted into one suite, having dressing room (with hot and cold water) adjoining. Surrounding the deckhouse is one of the first-class promenades; on either side of the house on the straight this promenade is no less than 430 feet long, with a minimum width of 8 feet. At the aft end for 100 feet long it extends from side to side of the ship.

Encircling the promenade at the forward end of the deckhouse, a screen is erected at the ship's side and across the



VIEW SHOWING CRUISER STERN, R.M.S. "EMPRESS OF RUSSIA."

ship 8 feet in front of the house, with large observation windows, which will give a sheltered promenade 240 feet long. Forward of the screen, the bridge deck continues to the forecastle deck, and is fitted with powerful cable holders and capstans for quick and efficient handling of the vessel.

At the head of the grand staircase is situated the promenade deck, with a deckhouse 320 feet long by 44 feet broad, in which are first-class state-rooms for one or two persons, handsome parlor suits of two, three and four rooms, all self-contained with bath-room, dressing-

have received special consideration in view of the length of the voyage and the variety of climate the ship will pass through. All the latest devices for the quick handling and control of the ship have been installed. A dining-room served by an electric lift from the ship's main pantry, and a cosy smoke-room are among the arrangements provided for the officers' comfort.

Heating and Ventilating.

An outstanding feature of the vessel is the size, design, and quality of the

The electric generating plant, consisting of five independent sets of engines and dynamos, provides a complete system of electric lights, radiators, and power for the large stokehold fans, also for the ventilating fans throughout the ship, and the silent working cranes and winches for rapid handling of cargo. Signalling at sea can be carried on by a semaphore on the bridge of the type used in the British Admiralty for short distances, while the equipment includes, of course, the long range Marconi system.

Engine-Room Equipment.

The propelling machinery consists of four turbines of the Parsons type, embodying the most recent improvements in design and construction to ensure the maximum economy of fuel consumption on service being attained. The port wing shaft is driven by a H. P. turbine which will exhaust into a L. P. turbine driving the starboard wing shaft. The two inner shafts are each driven by a L. P. turbine which has a powerful astern turbine incorporated in the same casing.

The introduction of an I. P. turbine to the installation provides a much wider range for the expansion of the steam, and will effect a marked improvement in steam consumption as compared with the usual arrangement of turbines driving either three or four shafts, adopted in some large mail steamers and naval vessels. Hitherto, these have been fitted with either one H. P. turbine exhausting with two L. P. turbines, or two H. P. turbines exhausting to two L. P. turbines. For manoeuvring when entering or leaving harbors, independent high pressure steam connections are provided on each L. P. ahead turbine. An independent high pressure steam connection has also been provided on the L. P. turbine, which, combined with a suitable arrangement of valves, enables the H. P. turbine to be cut out, or should the I. P. turbine be out of action, the H. P. turbine can exhaust direct into one or other or both of the L. P. turbines.

The four turbines are situated in one watertight compartment, and in a separate compartment immediately aft, the two condensers are placed, together with the circulating pumps, dual type wet and dry air-pumps, evaporators and distillers. The circulating pumps and air pumps form two distinct and separate sets, each set working in conjunction with one condenser, and independent of the other, but are also arranged with suitable cross connections, so that either set of pumps can, in case of emergency, work in conjunction with both condensers.



WRITING ROOM.
VERANDAH CAFE.

FIRST-CLASS DINING SALOON.
FIRST-CLASS SMOKING ROOM.

PUBLIC ROOMS ON THE NEW C.P.R. LINER, "EMPRESS OF RUSSIA."

room and lavatory accommodation. At suitable intervals in the deckhouse, other stairways have been fitted, giving easy access to the first-class on the bridge-deck below and the saloon on the shelter deck. Midway in the length of the deckhouse is the lounge, 48 feet long by 36 feet broad and 14 feet high at the centre.

Further aft a waiting room has been introduced, and at the aft end a smoking-room and verandah cafe, occupying a space 57 feet long, 43 feet broad and 14 feet high. Around the deckhouse is an open promenade with screen protection at the forward end, similar to that fitted on the bridge deck. On the house top with an internal stairway from the deckhouse on the promenade deck a large gymnasium, 16 feet long by 28 feet broad, is fitted up with a extensive variety of exercising machines, including rowing, vibrator, astride and side saddle machines.

The officers' accommodation and navigation bridge forward on the house tops

public rooms, parlor suites, special and ordinary staterooms, also the large proportions of the second-class and Asiatic accommodation. The public rooms in the one ship are of English design, and in the other of French design. Each first-class room or public room is heated and ventilated on the thermo tank principle, as is also the second and steerage accommodation, about 20 of these tanks being distributed throughout the length of the vessel. Natural ventilation has also been provided in various sections. Electric radiators and electric fans can also be used on the state or public rooms should conditions so demand. The sanitary accommodation is of the most improved description, each group of lavatories being fitted with an ample number of baths, showers, wash-basins, etc., supplied with hot and cold sea and fresh water, the fresh water passing through specially designed filters. A powerful electric suction fan in each section keeps lavatories fresh.

The installation of auxiliary machinery is exceptionally large, and, as in the case of the turbine installation, has been designed with a view to securing the greatest economy in fuel consumption and convenience in working. The feed water system for the boilers comprises two twin filters of the gravitation type, through which the water from the air pumps is discharged on its way to the hot-well tanks; two hot-well pumps which discharge the feed water first through a surface feed water heater and afterwards through a contact feed heater, from which the four feed pumps take their supply and discharge direct to the boilers.

The feed water is heated by the exhaust steam from the auxiliary machinery throughout the ship, the steam from ship's heating systems and drainage systems from steam pipes, etc. The system evolved is the result of careful consideration, and will ensure that all waste heat from the auxiliary steam and exhaust systems is utilized in heating the feed water instead of the heat being carried away by the circulating water from the condensers.

Auxiliary Machinery.

For harbor use a separate auxiliary condenser with circulating pump, air-pump, feed filter and feed pump is fitted to admit of the corresponding auxiliary machinery used on service being opened out for cleansing and examination as necessary. All the bearings for the turbine and line shafting are connected to the forced lubrication system, and the oil supply is maintained by four large oil pumps which discharge the oil through special coolers before entering the bearings. Separate pumps are fitted for circulating cold sea-water through the oil coolers. Drain tanks, in which the oil gravitates from the bearings and settling tanks for separating any water or impurities from the oil, are fitted in the condensing-room. The pumps for ship's service consist of two general service pumps, three sanitary hot and cold water pumps, two bilge pumps, two fresh-water pumps, and a ballast pump.

Refrigerator Plant.

The refrigerating machinery and electric machinery are situated in a separate compartment aft of the condenser-room. In view of the service in which these vessels are to be engaged, the installation of refrigerating machinery fitted is very large, and comprises two machines supplied by the Liverpool Refrigeration Co. for the preservation of perishable provisions for ship's use. A

series of insulated chambers are fitted, having separate compartments for meat, fish, poultry, game, dairy produce, fruits, vegetables, ice, etc., each of which can be refrigerated to the desired degree of temperature, some of the coldest rooms having to be kept 20 deg. Fahr. below freezing point, and others at comparatively warmer temperatures.

These chambers are placed in the lower 'tween decks amidships, and in addition, there are a number of cold larders, bar refrigerators and water coolers in various parts of the ship for the use and conveniences of the stewards' department, and for the provision of iced drinks for the passengers. All these are refrigerated direct by the machines, and are under easy control. An ice-making plant is also provided for making ice on board for the ship's use.

The machinery is in duplicate throughout, and is on the Liverpool Refrigerating Co.'s well-known carbonic anhydride system. Each machine includes a steam-driven CO₂ compressor mounted on a heavy tank base in which are the gas condenser coils of solid drawn copper tube, specially made to withstand the high working pressure. The evaporators and brine pumps are placed in an insulated house partitioned off from the machinery space. In this house are also placed all the cold parts of the machinery, such as valves, headers, etc., where they are efficiently protected from outside heat, while being perfectly accessible. Either machine is capable of doing the whole of the work required, the other being a standby.

Boiler Installation.

Steam is generated in six large double-ended boilers and four single-ended boilers, situated in three separate compartments, and working under the Howden system of forced draught, the air supply being maintained by an installation of electrically-driven fans fitted in duplicate and situated on the main deck. Throughout the whole of the 64 furnaces, the "Regulator" patent furnace bridge has been fitted by the Regulator Furnace Bridge Co., Ltd. The two pole masts and three large and well-proportioned elliptical funnels, one for each boiler compartment, give the vessel a strikingly handsome appearance.

For dealing with the ashes at sea, See's ash ejectors are fitted in each stokehold, and in each boiler compartment a specially designed ash ejector pump for supplying the water under pressure to the ejectors is fitted. Steam ash hoists of a silent type are also fitted in each boiler compartment for harbor service. The ash hoisting arrangements have received special consideration in order to minimize the noise which is so objectionable, and this machinery has, therefore, been removed entirely from the vicinity of the passenger quar-

ters. The Willet-Bruce automatic steamship whistle control has been supplied to the vessel, while the pumps are fitted with Downie's patent dead light valves.

Speed Trials.

The Empress of Russia ran her trials on March 22. Loaded to a mean draught of 26 ft. 8 in., and carrying over 7,000 tons dw., she proceeded to the measured mile at Skelmorlie, where a series of progressive runs were carried out at speeds ranging from 12 to 21¼ knots, the contract maximum requirement being exceeded by three-quarters of a knot. The vessel returned to the Tail of the Bank in the evening to be ballasted to a deeper draught for a further trial of 600 miles at sea. Sailing again at 10 p.m., she completed a run of 610 nautical miles by about 5 o'clock on the Monday morning, her average speed over the whole distance working out at 20½ knots, or half a knot in excess of the contract stipulation. Furthermore, the coal consumption proved to have been about 10 per cent. less than the contract requirements. Finally, a series of stopping and circle trials were carried out with thoroughly satisfactory results.

We understand that the results as regards speed, absence of vibration, and steering, have fully justified the owners' decision to adopt the Fairfield Co.'s latest idea in the design of merchant vessels.



IMPROVED CANADIAN WEST INDIES SERVICE.

THE Dominion Government has, it is understood, completed arrangements for an improved steamship service between Canada and the West Indies. The arrangement is a temporary one, the contract being for a year. The old service was provided by the firm of Pickford and Black, with four boats, sailing from Halifax every twelve days, and calling at St. John on the homeward voyage. The subsidy paid by the Government for this service was \$100,000.

The new service will call for a subsidy of \$200,000. Pickford and Black will have other steamship interests associated with them, and two first-class modern passenger vessels will be placed on the route. The ports of call will be the same as under the old contract, providing a service between Canada and all the islands which are parties to the new trade agreement between the Dominion and the British West Indies.

It is understood that no offers were received for a lengthier contract on terms satisfactory to the Government.

New Elevator at United States Most Easterly Lake Port

Being the Description of a Recently-Erected Concrete Grain Storage Unit, Which Replaces the Old Wooden Elevator Destroyed by Fire Two Years Ago at Ogdensburg, N. Y.

OGDENSBURG, New York, is the most easterly Great Lakes Port in the United States. It is not directly on any of the lakes, but a few miles down the St. Lawrence from Lake Ontario. This means, however, that the advantages of cheaper water freights are increased in the case of Ogdensburg by the comparatively longer water haul. Not only is Ogdensburg the most eastern port on the Great Lakes on the American side at the present time, but it always will be. Immediately below Ogdensburg, the St. Lawrence River breaks into rapids and on the Canadian side of the river, canals have been built around these rapids. On the American side there is no ship canal, nor will there ever be, because, just at the foot of the rapids, the international boundary line crosses the river, which, from that point for 1,100 miles, runs through Canadian territory exclusively. Ogdensburg is, therefore, at the extreme Eastern end of the combined Great Lakes and St. Lawrence River route as far as the United States is concerned.

Ogdensburg at a Disadvantage.

Unfortunately for the development of the city, nature arranged Lake Erie at a considerably higher level than Lake Ontario. The obstacles presented by the Niagara River have for many years

obliged lake traffic to halt at Buffalo and the result has been the development of that enormous grain port. It is true that the Canadian Government has, for a long time, had a canal across the neck of land between Lake Erie and Lake Ontario, but this, the well-known Welland Canal, can only accommodate vessels of 14-foot draught, and of a length of approximately 200 feet. Lake Ontario and St. Lawrence River ports can, as a consequence, be visited only by inland vessels of a very restricted size. The grain traffic at Ogdensburg has been restricted practically to that handled by the Rutland Railroad Co. on their package freight steamers from Chicago and Milwaukee and to an occasional tramp boat of small size.

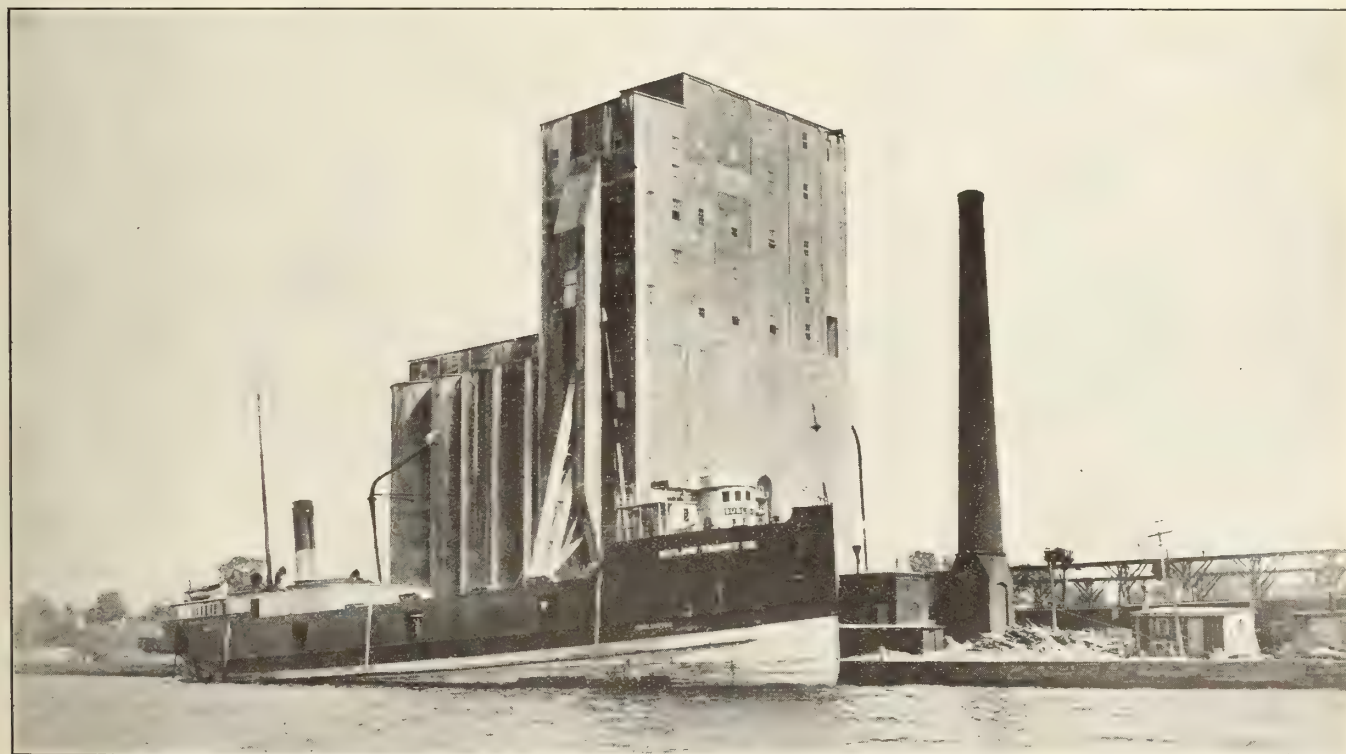
The New Welland Canal Feature.

The Canadian Government has now started work on a deeper Welland Canal with larger locks, and although it will be some years before this is completed, yet, when the work is finished, vessels of 21 feet draught and of Great Lakes size can reach Lake Ontario and go down the St. Lawrence River as far as Ogdensburg. Ultimately, if the Canadian Government deepens and improves the St. Lawrence Canals, these large vessels will also be able to reach Montreal; but, even in that event, grain carried on the

Great Lakes for export from United States points or for domestic consumption in the East will stop at the easternmost United States port, Ogdensburg. Should it occur, as now seems probable, that the deepened Welland Canal is completed, a considerable time before the St. Lawrence Canals are improved, it is even reasonable to anticipate that a certain amount of Canadian-bound grain will be trans-shipped at Ogdensburg from the largest carriers to vessels of canal size.

Elevator Features.

With a view to having Ogdensburg properly equipped when the new Welland Canal is completed, the Rutland Railroad Co. has recently erected a rapid-handling marine elevator at that point, and in planning a house to replace the elevator destroyed by fire in 1910, the railroad kept in view the necessity of handling grain quickly, and of arranging a plant which would be capable of extension. The new elevator is at present of 500,000 bushels capacity, but is so designed that additional storage capacity to any reasonable amount may be added. The elevator uses a portion of the pile foundation of the former house, numerous piles having been driven to take care of the additional load of concrete building. The former plant,



NEW GRAIN ELEVATOR RECENTLY ERRECTED AT OGDENSBURG, N.Y. BY THE JOHN S. METCALF CO., MONTREAL.

MARINE ENGINEERING OF CANADA

with the addition of purchased electric power, is used to drive the new elevator.

The entire elevator is of reinforced concrete throughout, including marine tower, bins and car shipping house, with a structural concrete cupola, curtain walls, floors and roofs. The marine leg has an unloading capacity of 18,000 bushels per hour on the dip and is provided with ship shovels and clean-up shovels operated by air. A 400-bushel hopper scale weighs the stream of grain from the marine leg, and a 2,000-bushel hopper scale is used for shipping to barges. Aside from the marine leg, there is a loft, a shipping and a transfer leg.

Two car spouts are provided, giving the shipping house a loading capacity of from 60 to 80 cars per day. This is aided by good track room for loads and empties. The bins in the car-loading elevator are rectangular, while those in the storage portion of the building are cylindrical. The average size of the bins is small, to provide for a maximum number of small shipments for interior points. When the larger carriers come to Ogdensburg and additional storage is built, larger bins, similar to those in Buffalo and at Georgian Bay ports, will be constructed.

Mr. Thomas Callahan is superintendent of the elevator, having been in the service of the railroad in that capacity for many years. The new concrete elevator was designed and built by the John S. Metcalf Company, Chicago and Montreal, who also designed and constructed the old wooden elevator which was erected in 1888.

CANADIAN SHIPYARDS.

IN view of a statement made by Premier Borden, when introducing his navy proposals a few months ago, to the effect that in his opinion no shipbuilding organization of an efficient character could be completed in the Dominion within a quarter or, perhaps, half a century, considerable interest attaches to a letter which was received by a prominent member of the House of Commons, Ottawa, from the manager of the Fore River Shipbuilding Co., Quincy, Mass.

Among other things, the communication states that work on their new plant was begun on April 20, 1900. The keel of the first vessel, the United States steamer *Des Moines*, was laid on August 28, 1900, in the new yard, and the machinery and buildings of the old establishment at East Braintree, about two miles further up the river, were moved during November, December, and January following, all work being under way in January, 1901, at the new shipyard. The contracts for the first battleships, the *New Jersey* and *Rhode Island*, were

signed on February 15, 1901, the keel of the latter being laid May 1, 1902, and of the former on April 2, 1902. This delay was caused more by the non-receipt of revised plans from the Navy Department, Washington, than anything else. During the past twelve years, no fewer than 114 hulls have been completed or are in hand, including those of five submarines, a torpedo boat destroyer, the battleship *Nevada*, a big old tanker, and the war vessels previously named.

In this connection, it may be mentioned that preparations are now being made for laying down a shipbuilding plant on a large scale at Sydney, Cape Breton; St. John, N.B.; Halifax, N.S.; Montreal; and Esquimaux, B.C. Most of these yards will be able to turn out war and merchant vessels equal to any in size now afloat.

CANADA'S OCEAN MAIL SERVICE

ON April 7, the Hon. L. P. Pelletier, Postmaster General, in a brief statement to Parliament before the orders of the day were called, laid upon the table of the House the contract just concluded for Canadian ocean mail service. By its terms there will be inaugurated a tri-weekly fast mail between Montreal, Quebec, Liverpool and Bristol in the summer months, and a semi-weekly mail between Halifax, St. John and Liverpool in the winter months.

The mail will be carried by four lines of Trans-Atlantic steamers—the C.P.R., the Canadian Northern, the Allan and the Dominion White Star, in all twelve fast vessels will operate on the route in summer and eight in winter. The subsidy is to be \$1,000,000, an increase of some \$400,000, a portion of which will be saved from the amount of \$185,000 now paid annually for the service via New York.

The sailings from Canada will be on Tuesdays, Thursdays and Saturdays. The contract comes into force on May 1. The four companies concerned jointly and severally agree to secure some other vessel should any of those stipulated in the contract become disabled at any time.

Vessels in the Service.

The vessels participating in the service will be the *Empresses of Ireland* and *Britain*, of the C. P. R. line; the *Royal George* and *Royal Edward* of the C.N.R. line; the *Victorian*, *Virginian*, *Gramscian* and *Hesperian*, with the two new vessels, the *Alsation* and *Calgarian*, of the Allan line, and the *Laurentic* and *Megantic* of the Dominion White Star Line. The eight boats for the winter services will be the two *Empresses*, the two *Royals*, the *Alsation*, the *Calgarian*, the *Victorian* and *Virginian*. The

White Star will not join in the winter service beyond supplying the *Teutonic* as a spare ship. The companies have the right of selecting which ports they will sail from. The million dollars will be divided into weekly appropriations, and the companies paid on the basis of weekly service performed.

The Postal Union Arrangement.

The Postmaster-General pointed out that the Postal Union, which included practically all civilized countries, during one month in every sixth year weighs up all the mail handled in the world and apportions to each country the amount it shall pay each other country for the handling of its mail. On this basis it was six years ago determined that the United States was entitled to an annual payment of \$185,000 for handling Canadian mail to Europe. Mr. Pelletier said that the world's mail would be weighed up next month. The improved steamship service from Canada would be in operation then, and it was expected that such a large proportion of Canada's mail would be going by Canadian routes that the amount Canada would have to pay the United States during the next six years for handling mail via New York would be substantially reduced.

He expressed the belief that the improved service would result in Britain paying a larger share of the cost of handling mail from the Motherland to Canada. Britain's contribution on this account was now \$23,000 per year, which was paid as Britain's share of the services of the *Victorian* and *Virginian* of the Allan Line. The amount would have been \$46,000 per year, but for the contention of the British postal authorities that the two *Empresses* were not Canadian, but British carriers, inasmuch as they were subsidized as a part of the Liverpool to Hong Kong service. The new scale of payment for mail carriage under the Postal Union will become effective Jan. 1, 1914.

DREDGE DIPPER TRIPS.

THE dipper dredges *Mindi* and *Chagres* operating in the Atlantic entrance channel to the Panama Canal and on coral rock excavation for the new piers of the Panama Railroad Co. at Cristobal, have been equipped with steam dipper trips which a test of six months has shown to be successful. The trips were installed by the dredge crews under the direction of one of the crane-men, Mr. Henry Cartier, who selected the most of the material from scrapped French machinery.

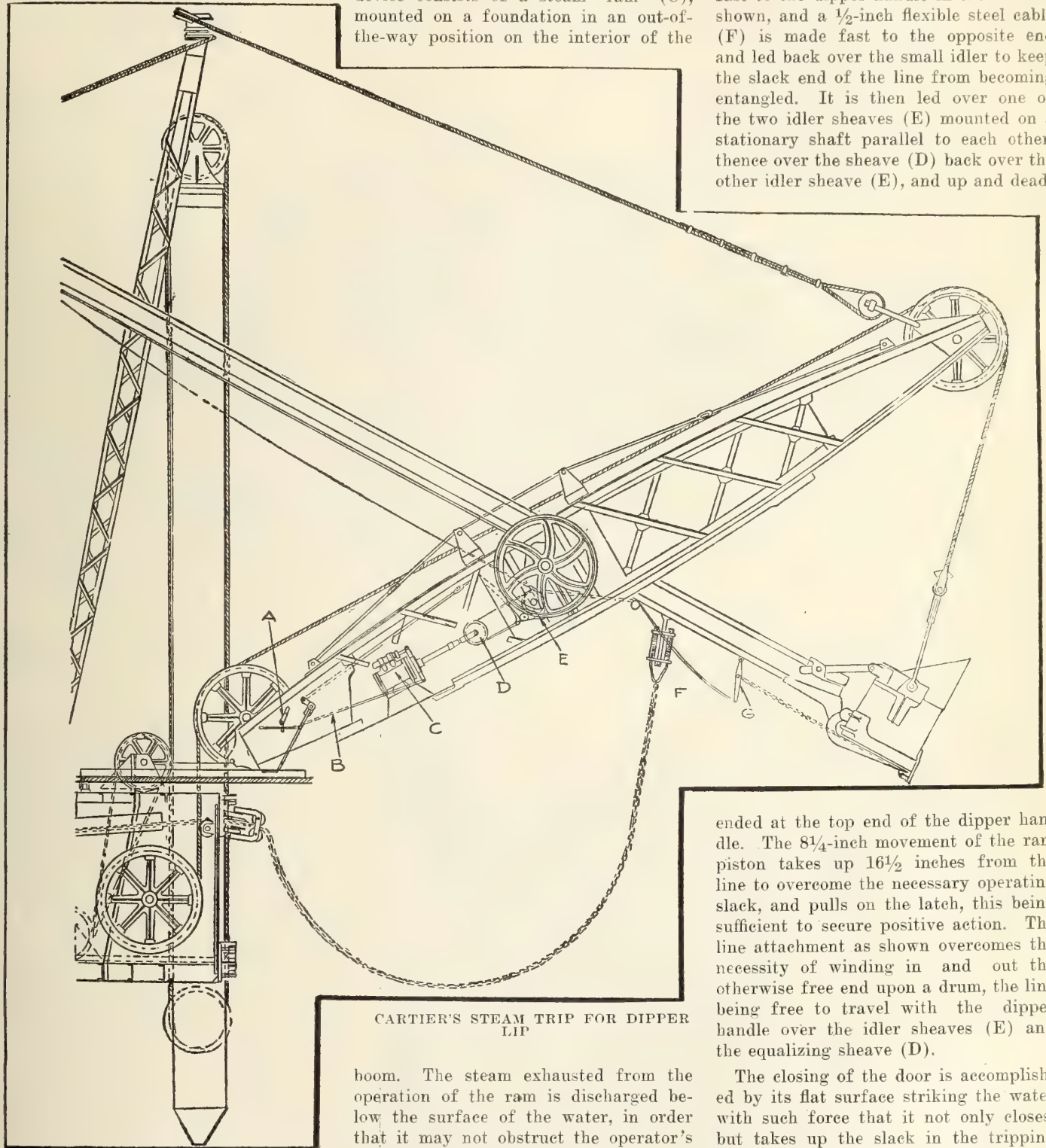
The dredges, mounting 5-yard dippers, are used entirely in rock, which when necessary, has been partly broken up by the operations of the drillboat *Terrier*.

They are cutting channels of a minimum depth of 42 feet at mean tide. This requires dipper handles of great length. **Cartier's Steam Trip for Dipper Lip.**

The procedure requires a quick-acting trip, to avoid spilling over the edge

and simple in construction, due to the arrangement of boom and dipper stick, and be so arranged that the tripping line would not have to be overhauled on a drum or otherwise. As will be seen by the accompanying sketch, the Cartier device consists of a steam ram (C), mounted on a foundation in an out-of-the-way position on the interior of the

on the supporting guide arms for the equalizing sheave. The cylinder valve is of simple design and operated through the operating lever (A) and the reach rod (B). The latch chain is led to the purchase lever (G), which is made fast to the dipper handle in the manner shown, and a $\frac{1}{2}$ -inch flexible steel cable (F) is made fast to the opposite end and led back over the small idler to keep the slack end of the line from becoming entangled. It is then led over one of the two idler sheaves (E) mounted on a stationary shaft parallel to each other, thence over the sheave (D) back over the other idler sheave (E), and up and dead-



CARTIER'S STEAM TRIP FOR DIPPER LIP

ended at the top end of the dipper handle. The $8\frac{1}{4}$ -inch movement of the ram piston takes up $16\frac{1}{2}$ inches from the line to overcome the necessary operating slack, and pulls on the latch, this being sufficient to secure positive action. The line attachment as shown overcomes the necessity of winding in and out the otherwise free end upon a drum, the line being free to travel with the dipper handle over the idler sheaves (E) and the equalizing sheave (D).

The closing of the door is accomplished by its flat surface striking the water with such force that it not only closes, but takes up the slack in the tripping line (F) and pulls the piston into a starting position in the ram. The saving in time and the increase in yardage through use of this device cannot be arrived at, as no efficiency tests have been made, but it is known that a considerable increase in the yardage has been achieved.

of the barge on the return swing. Operation by hand was slow and uncertain, because of the weight and accumulated slack in so long a trip line, besides, requiring the use of both hands by the craneman. It was necessary that the tripping device be both positive in action

boom. The steam exhausted from the operation of the ram is discharged below the surface of the water, in order that it may not obstruct the operator's view.

The cylinder is 5-inch bore and has a stroke of $8\frac{1}{4}$ inches. The piston rod carries the equalizing sheave (D), and the jamb movement of the ram piston is decreased by allowing the shock to be taken up in two heavy $\frac{1}{2}$ -inch by $\frac{1}{2}$ -inch springs, $31\frac{1}{2}$ inches long, mounted

New Steamer "Alsatian" for Allan Line Canadian Service

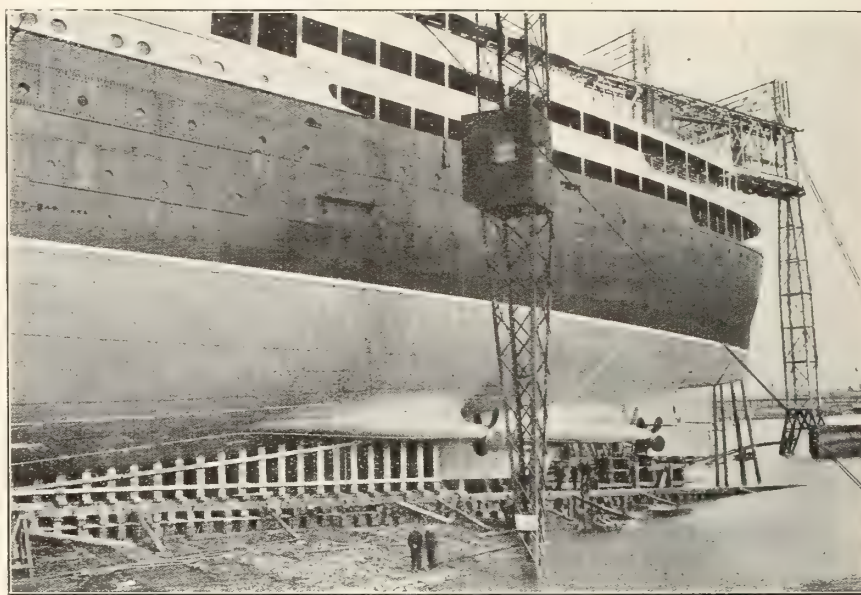
The desire to cater to the comfort and transportation of its patrons by keeping pace with an ever increasing standard of requirement has been the secret of the successful growth and development of the "Allan Line," and no one may challenge the assertion that Canada owes much to-day to the enterprise and dogged perseverance of the Allan family. This latest addition to the Co.'s fleet—the "Alsatian"—is evidence that the old spirit still prevails.

IN our February issue a brief outline of the new Allan liner *Alsatian* was given, together with an illustration of the ship as she will appear when completed. The vessel was recently launched, and, from the information concerning her to hand, we are now able to give some details and illustrations connected with that ceremony, as well as supplementary information concerning the structure and general equipment of the ship.

The *Alsatian* was launched from the shipyard of Wm. Beardmore & Co., Dalmuir, near Glasgow, on Saturday, March 22. The vessel is 600 ft. in length on the water-line and 570 ft. b.p., with a breadth moulded of 72 ft., and a depth moulded of 45 ft. 6 in. She is of 18,000 tons gross, 20,000 shaft horse-power, and is to have a speed of 19 knots on trial fully loaded and 18 knots on service. She has 8 decks, 11 watertight bulkheads, and accommodation for 200 first-class, 500 second-class, and 1,000 third-class passengers. The vessel has been specially strengthened forward for passing through ice, and has been constructed under special survey to meet the requirements of the British Corpora-

tion Registry, while the Board of Trade regulations for ensuring the safety of

carried well up the bilges as an additional protection in case of grounding.



STERN VIEW OF NEW ALLAN LINER, "ALSATIAN."

passengers and crews" have been more than complied with. A cellular double bottom is fitted all fore and aft, and is

Boats and other life-saving appliances will be provided sufficient for all on board. The vessel has the usual stem, but the stern is of the warship type, with exceptionally long outreaches beyond the after perpendicular.

General Features.

The *Alsatian* has four sets of en suite cabins, each consisting of two bedrooms, a sitting-room and a dressing-room, so arranged that the sitting-room may be let separately as a one-berth state-room, or with either or both of the bedrooms. There are also eight special cabins with bathrooms adjoining. In addition, there are 16 other special state-rooms, with bath-rooms communicating with each pair of rooms, and so arranged that the bath-rooms can be let with either room. The remainder of the first-class sleeping accommodation consists of one and two-berth cabins, and the public rooms comprise a gymnasium, a verandah cafe, and an upper smoking-room on the boat deck, a library, a lounge, a card-room, also a lower smoking-room on the upper promenade deck, and a dining saloon on the shelter deck. The saloon will seat 220 persons, and will have small tables for two, four, six and eight. The whole of the furniture, panelling, etc., in the first and second-class public rooms and



STERN VIEW SHOWING PROPELLERS, NEW ALLAN LINER "ALSATIAN."

suites will be of oak, and in the Jacobean style throughout. Accommodation will be provided for 500 second-class passengers in two and four-berth rooms. The third-class accommodation can be divided if required into two portions, each complete in itself, so that either part can be placed in quarantine if necessary.

Propelling Machinery.

The propelling machine consists of Parsons compound steam turbines, arranged in series on four shafts, and includes one high-pressure, one intermediate, and two low-pressure turbines. Two astern turbines, each with impulse reaction blading, are incorporated with the low-pressure turbines, and the latter drive the inner lines of shafting. Steam is led direct from the boilers to each turbine, and any one shaft may be operated independently of the others. Six double-ended and four single-ended boilers of the cylindrical type, working at a pressure of 200 lbs., under forced draught, and arranged in two compartments, are installed.

The Christening Ceremony.

The naming ceremony was performed by Mrs. Hugh Allan, wife of the Allan Line chairman. The Marquis of Graham took the chair at the subsequent luncheon, and amongst others present were the Duke and Duchess of Montrose, Mr. Hugh A. Allan, Mr. W. R. Allan, Mr. W. W. May, Lord Malise Graham, Col. J. Smith Park, Vice-Admiral Bearcroft, Dr. John Inglis, Mr. A. J. Campbell and Mr. J. Foster King.



VICTORIA, B.C., SHIPBUILDING.

MR. J. V. PATTERSON, president of the Seattle Construction and Drydock Co., recently gave his impressions of a brief visit to Victoria. He said:

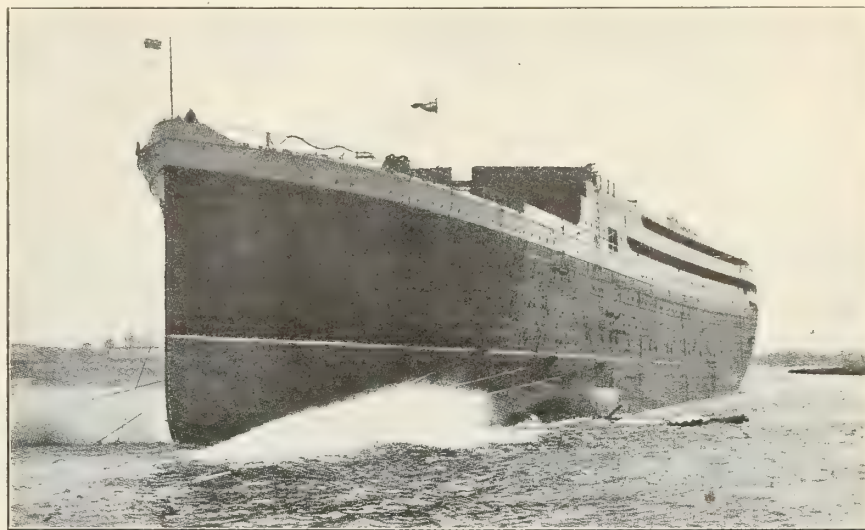
"I was accorded the courtesy of inspecting the plant and shipbuilding yards of the B. C. Marine Railway Com-

pany at Esquimalt, and I must say I was not only greatly interested in learning how complete are the facilities at this port for the upbuilding of a great national industry, but astonished at the failure to give those essential encouragements which we on the other side of the line have had conceded.

"I was allowed to inspect the fine steel steamship Princess Macquinna, now approaching completion for the Canadian Pacific Railway, and I can testify that she is, in my judgment, a

shortly you will find yourselves hopelessly outclassed in respect of shipbuilding facilities unless, to use a slang phrase, you 'get a move on.'

"You are going to have a large dock, and shipbuilding yards are inseparable from its successful operation. To give you an illustration: In order that a ship which has been docked for repairs can have the same effected with despatch, it is essential that there shall be immediately available large gangs of expert workmen. Now, it is obvious that these



NEW ALLAN LINER "ALSATIAN" AFTER THE LAUNCH.

credit not only to her builders, but to Canadian shipyards. I doubt very much if a more staunch and generally creditable craft could be produced in any port of the world, notwithstanding the obvious disparity between the facilities at this port and the large shipbuilding centres.

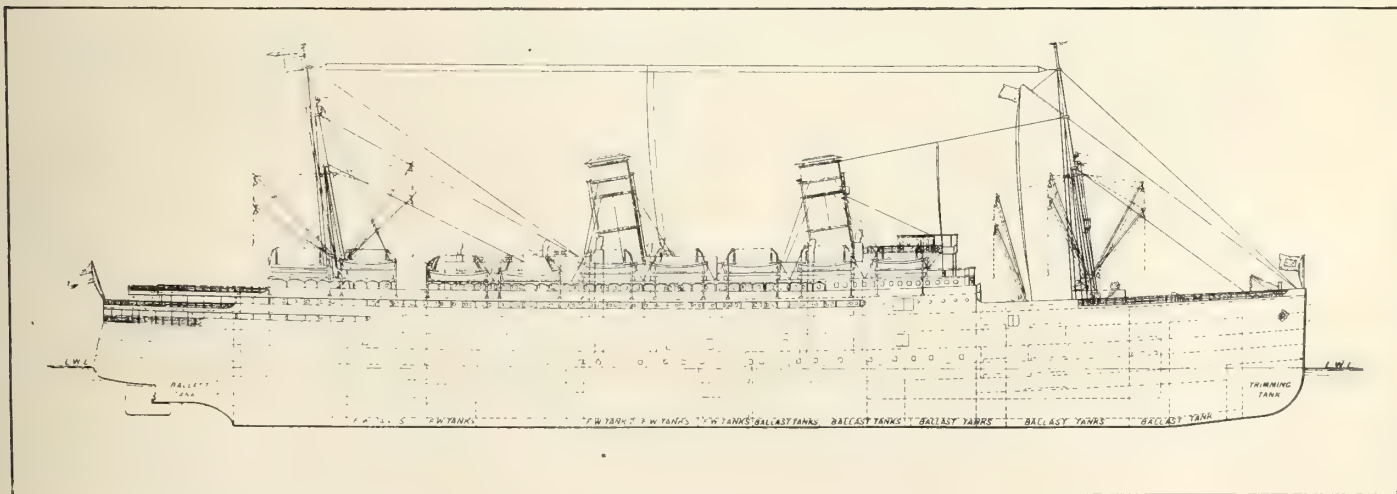
Tremendous Opportunities.

"In view of the tremendous opportunities which are just opening to the whole of the North Pacific Coast, due in large measure to the imminent opening to traffic of the Panama Canal, there can be no question whatever that very

men cannot stay unless there shall be provided a continuity of work at the shipbuilding yards. All this may be rudimentary, but it is a lesson which must be learned if your people are to understand the situation.

Continuity of Work.

"The duty of the Government in the matter is clear—and, of course, in saying this I am mainly depending upon what I have learned respecting the United States Government's action under similar circumstances. My company has been particularly fortunate in this respect, as the Government has given a



QUADRUPLE SCREW TURBINE ALLAN LINE STEAMSHIP, "ALSATIAN."

margin of protection to the shipbuilding industry, the coastwise trade being conserved for the benefit of American-owned vessels, which must be American-built craft.

"One of the difficult things we have to contend with when we have attempted to arouse public interest in shipbuilding is that of getting people to understand that with the yards and plant there will be built industries of all sorts which enter into the construction and equipment for service of a steamship. If you were to go into it closely you would be amazed at the great variety of trades which are stimulated by the industry.

Need of Local Industries.

"What struck me forcibly during my tour round the city is, first of all, your need of local industries. After all, it is 'the man with the dinner pail' who is the biggest factor in the permanent life of the community, and you should put your shoulder to the wheel and try and get more of that individual. Then I was surprised to find that while at Esquimalt and points in your inner harbor you have the most splendid natural facilities for the development of shipyards, you are not prepared for what the future undoubtedly holds for you in the way of shipping expansion in these waters. As I said before, considering the many handicaps under which the industry has to plod along in Canada, compared with conditions on my side of the line, I can only express amazement that your shipbuilding people have done so well."

An Object Lesson.

The company of which Mr. Paterson is the head has the greatest confidence that as a result of the opening of the Panama Canal there will be a very large increase of shipping in North Pacific waters, and, anticipating that event, they have completed the construction of a large floating dock at Seattle of 26,000 tons capacity.

Government Assistance.

As indicating the policy of the United States Government in assisting to secure continuity of work at the yards, Mr. Paterson mentioned that his company has at present under construction six submarines for the United States navy, a dredge for the Government, an ocean-going passenger steamship, a cargo boat for the coastwise trade, a tug boat for the Milwaukee Railway, and a very large sea-going yacht, which will cost some \$380,000.

This company, it will be remembered, constructed and equipped the battleship Nebraska, which proved one of the most efficient and satisfactory vessels in the United States navy.

"When one considers that our shipbuilding plant and its achievements in building are on a site which not so very many years ago was a howling wilderness," concludes Mr. Paterson, "one realizes that, given a chance, we on this virgin section of the globe can make successful attempts to build up great national industries, if unnecessary handicaps are removed from our paths. What we have accomplished on our side of the line I am sure you can and will accomplish here."

"BENGORE HEAD" APPEAL.

THE following statement has been issued by The Imperial Merchant Service Guild, London, Eng.:—

The Imperial Merchant Service Guild are at present actively engaged in furthering an appeal by Captain J. C. Hoy, one of their members, late master of the S.S. "Bengore Head," from a decision of the Canadian Wreck Commission Court at an inquiry held into the stranding of his vessel. The facts in connection with the disaster were that the master, after leaving Quebec outward bound, had been on the bridge from 6 p.m. until 2 p.m. the following day, a spell of 20 hours in all, without rest, navigating his vessel along a dangerous waterway in thick fog. He took advantage of an improvement in the weather to take a short rest, leaving in charge a thoroughly qualified officer, who was fully instructed as to what to do in any case of emergency. The master's object in doing this was to fit himself for a further long spell of duty, his intention being to resume charge of the vessel before dark in order to navigate it safely out of the Strait of Belle Isle.

The instructions left by the master were not accurately carried out, and the ship stranded whilst he was still in his room, the officer in charge not having communicated with him at all during his absence. In spite of these facts, the court of inquiry not only suspended the certificate of the officer for nine months, but also suspended the certificate of the master for three months. The Guild undertook the defence of the master at the original inquiry, and when the result was made known to the management committee, they at once decided to take a legal opinion upon this matter.

On receipt of this, the committee being of opinion that the suspension was a great hardship and injustice to the master, decided that no expense should be spared in endeavoring to reinstate him in the eyes of the world and of his professional brethren. They accordingly entered an appeal to the High Court, to

which the Board of Trade have been made a party, and eminent counsel will be instructed to represent the interests of Captain Hoy at the hearing, which is expected to soon take place in London.

GRAIN ELEVATORS.

ELEVATORS as a means of housing and handling grain did not make their appearance until the latter part of the last century. According to Concrete and Constructional Engineering, the first real elevator of which there is any record was the "cribbed" wood type, and there are still a good many of these houses in existence. [This old type is interesting when it is considered that at one time an elevator of nearly four million bushels capacity was erected complete, and almost totally filled with grain, in a period of forty-four days. Of course, lumber was plentiful, and no expense was spared and no restrictions put on the builder except to gain time. The first fire-resisting elevators were built of steel, practically on the same plan as the old wooden structures, which were rectangular in plan and had cribbed bins elevated on posts and usually arranged to suit unloading conditions.

Up to this point, all storage and handling devices were carried under one roof, but it was then demonstrated that all machinery for unloading, handling, and shipping could be more economically installed in separate buildings called the working house. This was accomplished by having two or more parallel tracks alongside the house for unloading, thus shortening the house and necessarily making it more economical; a separate building for storage having larger compartments than in the working house being erected. At about this time, brick, tile and concrete came into common use in the construction of elevators.

REGARDING INSURANCE.

DECIDED steps have now been made towards securing better insurance rates for vessels travelling on the St. Lawrence route. R. J. Dale, who has recently returned from a conference with the Underwriters in London, read a letter to the Montreal Board of Trade Council, on April 17, that caused general satisfaction and gave promise of an early revision of the rates.

In the letter Herbert S. Hines, of the Institute of London Underwriters, states:

"The extensive works undertaken by the Government of the Dominion of Canada for the improvement and safer navi-

MARINE ENGINEERING OF CANADA

gation of the St. Lawrence River are fully recognized and appreciated here, and that so far from the underwriters or the marine insurance companies on this side being inimical to the interests of Canadian producers and Canadian shippers, it is their earnest desire, so far as the exigencies of their business permit, to fully consider the interests of both, and so far as possible, to give effect to any alteration or amelioration in the terms of insurance which may tend to the advantage of Canada and of all those who are engaged in promoting and fostering her great industries and natural resources.

Marine Insurance Risks.

Mr. Hines also informed Mr. Dale that as a result of the latter's conference

NAVIGATION OPEN AT MONTREAL

THE first ocean-going steamer to reach Montreal this season, the Sokoto, of the Elder-Dempster Line, docked on the afternoon of April 21. She came from Mexican ports. Captain J. L. Pierce, a Norwegian, her master, received the gold-headed cane, which is customarily given by the Harbor Commissioners to the first captain of an ocean steamer up the river each season. The steamer brought 30,000 tons of asphalt from Santa Cruz.



THE AQUITANIA LAUNCHED.

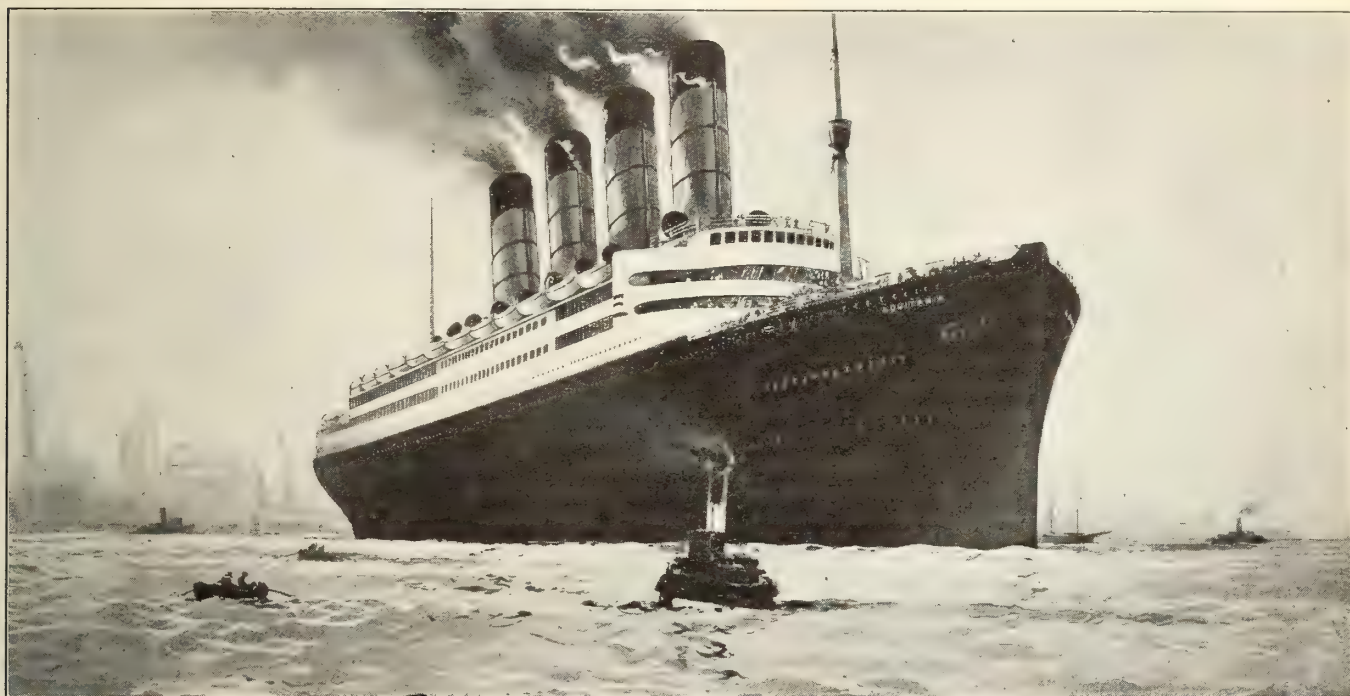
THE largest steamship ever built in Great Britain, the Cunard liner Aquitania, was successfully launched on

That the pension fund be taken over and managed by the Minister of Marine and Fisheries.

That the Government appoint a superintendent of sea-going experience to full charge of the district, to organize and administer its affairs and be directly responsible to the Minister.

It is also proposed that examinations of candidates should be carefully conducted, under proper supervision, either in English or in French, each candidate having previously passed a physical and standard eyesight test.

With regard to Quebec pilotage, the report says that the whole system is loose and unsatisfactory. The superintendent appointed by the Government has generally superintended nothing,



CUNARD LINE STEAMSHIP "AQUITANIA," THE LARGEST VESSEL YET BUILT IN THE BRITISH ISLES, AND RECENTLY LAUNCHED BY JOHN BROWN & CO., LTD., CLYDEBANK, SCOTLAND.

with the London Underwriters, special sub-committees of the London Institute had been appointed in order to confer with the joint Hull Committee of Lloyd's and the marine insurance companies on the subject of marine insurance risks.

In his conference, Mr. Dale asked that vessels might be allowed to trade to Halifax and St. John without additional premium; that the period of navigation for a fixed additional premium, might be extended to the 15th if not to the end of October, instead of as at present to the 1st of September; that a smaller additional premium should be charged for vessels chartered for one voyage to the St. Lawrence, than is at present charged for cancelling the Baltic and British North American warranties.

the Clyde on April 21. The new vessel has a double hull, and will carry boats sufficient to accommodate 4,250 persons, the entire complement of passengers and crew.



ST. LAWRENCE PILOTAGE COMMISSION REPORT.

IMPORTANT changes are recommended in a report recently submitted by the Royal Commission appointed by Hon. J. D. Hazen to enquire into the pilotage system in the districts of Montreal and Quebec. The commissioners were Capt. Lindsay, Thomas Robb and Adjutor Lachance, Quebec. The proposed changes are:

That the Corporation of Pilots for and below the harbor of Quebec be abolished and the charter cancelled.

but got all information from the secretaries of the corporations, who submitted it to the Department as coming from themselves. The commission recommends the appointment of a board known as the Pilotage Commission, with functions partly executive and partly administrative.

In a comparison of pilotage earnings of Montreal and Quebec districts in 1911 it was found that the former was \$87,928.55, and the latter \$143,741.87.

Minority Report.

Mr. Lachance, in a minority report, differs from the other commissioners mainly with reference to the suggested abolition of the Pilots' Corporation. He gives a number of reasons, and makes two important suggestions:

First, that some restrictions should be made to oblige small craft to keep out of the narrow channel when there is sufficient water elsewhere.

Second, that their lights should not be all around the horizon, and that vessels from the lakes should be forced to submit to the rule of the road when navigating the St. Lawrence.

Mr. Lachance also suggests an increased tariff on ocean steamers, believing that the Montreal tariff is very low. He believes, in conclusion, that the Corporation of Pilots for and below the harbor of Quebec should be maintained with all its rights, especially in relation to the sharing of the earnings.



SHIPPING MEN BANQUETTED.

THE Sarnia Board of Trade recently gave a banquet which was in the nature of a welcome to the officers of the boats which have wintered at Sarnia, and also a recognition of two men whose duties past and present have been inseparable from the town.

Mr. H. H. Gildersleeve, is leaving to become head of the Western division of the Richelieu & Ontario Navigation Co., and Mr. Peter Paton will succeed him in charge of the Northern Navigation interests centred at Sarnia. The dining room of the Belchamber was handsomely decorated with flags and potted plants, and the end of the room above the guests of honor bore the legend "Sarnia, First, Last and All the Time."

Mr. T. H. Cook, president of the Board, was toast master, and kept everything running pleasantly. After some suitable remarks about the importance of the marine business in general, and particularly its importance to Sarnia, he paid a high compliment to Mr. Gildersleeve's splendid qualities which have won him such success. Sarnia would regret his departure as a friend, while congratulating him upon his step upward.

Mr. Gildersleeve thanked the Board of Trade for the honor done to the marine interests of the port, and for coupling his name therewith. He had found Sarnia and Sarnia people delightful, and would leave with regret. He bespoke for his successor, Mr. Paton, the best that the people of Sarnia could extend, and could assure them that they would find in him a good friend of the town.

The chairman, in introducing Mr. Paton, said he would be welcomed also as a former president of the Collingwood Board of Trade, and he trusted it would be possible to interest him along the same lines in Sarnia.

Mr. Paton Speaks.

Mr. Paton's face was wreathed in smiles as he rose to speak, in response to the chorus "See Him Smiling." He had so often been implicated, he said, in affairs of this kind when some other fellow was the victim, that he ought to know his part. He disclaimed any particular knowledge of marine matters, having been only two years with the company. He endorsed what Mr. Gildersleeve had said of the splendid body of men in charge of the boats. Personally he felt some diffidence in the presence of two of the captains, who were his seniors in years, but none whatever toward the younger captains, knowing that if they did not concur in his ideas he would only have to tell their wives, for both are henpecked husbands. Of marine matters, his first impressions were received from Capt. Foote.

Captain Foote has the splendid record of 29 years with the company of whose fleet he is Commodore. Of the other captains and officers of the fleet. Mr. Paton also had kindly words of praise. Referring to the removal of Mr. Gildersleeve from Sarnia, Mr. Paton spoke in feeling and highly eulogistic terms of that gentleman's ability as a marine man. Before concluding he thanked the Board of Trade for the honor done them.

The toast of the officers of the fleet was responded to by Capt. R. Foote, of the steamer *Hamonic*, Capt. Campbell of the steamer *Huronic*, Capt. J. McNab, Capt. John Williams, of steamer *Osler*, Capt. Wright, of steamer *Stadacona*.

The toast of the mariners was responded to by Capt. Hugh McKinnon and Capt. Birnie.



BABCOCK & WILCOX BOILERS.

MR. J. H. ROSENTHAL, in a paper read recently at the Institute of Marine Engineers, stated that, since the trials made by the Admiralty Special Boiler Committee of 1900, the Babcock & Wilcox boiler had been extensively adopted for large naval vessels. In the mercantile marine up to June, 1912, 542 Babcock & Wilcox boilers had been fitted in 253 ships, the total horse-power being 411,479.

A comparison of the cross-Channel steamers *Victoria* fitted with cylindrical boilers, and *Engadine*, fitted with Babcock boilers, showed that, on 79 and 94 double trips, respectively, the *Victoria* attained an average speed of 21.272 knots, and the coal used was 24.59 tons per trip; while on the *Engadine* the figures were 22.367 knots and 24.77 tons. It had also been found that on the Stranraer and Larne service there was economy of fuel in favor of the *Princess*

Victoria over the *Princess Maud*, a sister ship of the same power fitted with cylindrical boilers.

In the case of three sister ships of 8,000 tons displacement, engaged on the passenger service between New York and New Orleans, the average consumption for a series of voyages was as follows:—S.S. *Creole*, fitted with Babcock boilers, 1,149 tons; s.s. *Momus*, with cylindrical boilers, 1,412 tons; s.s. *Antilles*, with cylindrical boilers, 1,336 tons.

In an intermediate passenger steamer of 5,000 horse-power it had been estimated that by fitting Babcock & Wilcox boilers there would be an increase of heating surface of 25 per cent.; an increase of grate surface of 34.3 per cent.; a saving in weight of 225 tons; a saving in floor space of 14.33 per cent., and a saving in fore and aft length of 12 ft.

Mr. Rosenthal, replying to the discussion, said the tubes did hog sometimes; but this did not mean that they were appreciably deteriorated. Hogging was due to the presence of oil or other foreign substance, causing overheating. This was also the cause of local bulging. Much of the success of the Babcock boiler was undoubtedly due to the improved methods of tube manufacture.



CANADA AND THE ICE PATROL.

THE Department of Marine and Fisheries of the Canadian Government will co-operate with the British Board of Trade in the Iceberg Patrol of the North Atlantic by despatching the Government steamer *Montcalm* to watch and report the movements of ice in the Cabot Strait, between Cape Breton and Newfoundland. The *Montcalm* will carry Professor Barnes, of McGill University, who will further test his microthermometer invention for detecting the presence of icebergs.



STEEL FOR POLSON DRY DOCK

THE steel for a floating dry dock to be built at the Polson shipyards has arrived, and it is expected that a start on the work will be made shortly. When the dock is completed it will accommodate the largest passenger or freight steamer on the lower lakes.



The Booth Felt Co., Ltd., incorporated at Toronto to manufacture gaskets, and packings. Capital \$40,000. Incorporators:—N. E. Booth, E. W. Booth, T. R. Brawley, all of Brooklyn, New York; E. S. Sheppard and B. A. Booth, both of Gananoque, Ont.

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H. V. TYRRELL, Toronto - Business Manager
 PETER BAIN, M.E., Toronto - Editor

OFFICES:

CANADA

Montreal—Rooms 701-702
 Eastern Townships Bank
 Bldg.

Toronto—143-149 University
 Ave. Phone Main 7324

Winnipeg—34 Royal Bank
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Vol. III

APRIL, 1913

No. 4

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NAVIGATION SEASON, 1913.

BY the time this present issue of Marine Engineering of Canada reaches our subscribers the navigation season of 1913 will be in full swing. At the moment of writing, not only has a large percentage of the Lake fleet cast off from their moorings, but the great river St. Lawrence is also open to the broad Atlantic, as far as our commercial capital, Montreal. On the Great Lakes, so far as Canadian enterprise is concerned, many changes have taken place, and while nominally, for a time at least, the old steamship lines will be in evidence, new developments, due to the merging of individual interests in the Richelieu & Ontario Navigation Co., are, in the nature of things, bound to come into effect. That the economic advantages accruing from a combined interest of those involved may have its counterpart so far as freight and passenger patrons are concerned is a consummation to be desired.

Each recurring season now marks a very appreciable advance on its predecessor, in the matter of ship equipment, their handling, in provision for their guidance when pleasant weather prevails and in arrangements made for relief and rescue when the waters are tempest-tossed and in an angry mood. The lessons of each succeeding experience are laid to heart and put to profitable purpose in meeting and combating similar or more exacting conditions should they arise. "Those who go down to the sea in ships and do business in great waters," as a result, approach their chosen calling each year with added confidence, and while there may and will be stress and storm to be met before King Frost again asserts himself, and some vessels and lives, more or less, may be sacrificed when disaster overtakes, there is pleasure and pride everywhere on our rivers, lakes and coast line, that King Sol is again supreme, and with the opening of his reign, sailing craft of every type and description, and hardy men and boys to man them are at their posts, eager enthusiastic and confident.

THE "DREADNOUGHT" CONTRIBUTION TO BRITAIN.

WE are inclined to think that the doings of our parliamentarians at Ottawa relative to the \$35,000,000 contribution to Great Britain towards the building of three Dreadnoughts, whatever else they may have shown, indicate, pretty clearly, that the question is merely an excuse for a party battle, and that, if any conscientious ideas of a combined duty to the Motherland and their own country entered into the project at first, there is little evidence of the latter, now existent.

We had hoped to see incorporated in any proposition of assistance to Great Britain, arrangements for the propagation of existing shipbuilding and marine engineering industries, together with the establishment of additional and accessory plants. The restricted vision of those who support the contribution, only, is to be regretted, being as it seems to us nothing short of a desire to adopt any course, so long as it be an opposite one, irrespective of the claims and needs of this Dominion to add further to her industrial achievement. Too much capital is made of the representative value of the heterogeneous majority constituting the party in power, and which, after all, is in no sense entitled to express the views of our population on the subject. The present government went into power on a particular issue, vital, if you like, and on a no less vital question—the welfare of this Dominion industrially, should our electors also be allowed to exercise their views through the ballot box, if no other settlement of the deadlock be possible. Any policy which does not seek to stimulate the feature of our own industrial enterprise, cannot be regarded as one which will add to our country's wealth and welfare. Both Liberals and Conservatives should at once cease sparring for its own sake, and get together with an earnest desire and purpose to create a policy which will express the ideas of the people of the Dominion and at the same time aid its upbuilding and render loyal individual support to the Empire.

The past few months have made our rulers the laughing stock of the world, and have certainly created misgivings in the minds of those responsible for the direction of Imperial affairs, as to worth of purpose of those who are supposed to speak for Canadians, on either side of the House. The Dominion as a field for shipbuilding enterprise will have to be reckoned with sooner or later, and no shortsighted policy pursued by statesmen whose personal purposes are first considerations, will stay its progress.

MONTREAL HARBOR IMPROVEMENT.

THE estimated cost of works for the harbor improvement to be undertaken by the Montreal harbor commissioners this season is over \$2,000,000, and the programme which has been drawn up includes works which will have the effect of diminishing the velocity of the St. Mary's current, and making its navigation perfectly safe in the near future. The programme of works this season marks the commencement of the second stage of the great plan for the improvement of the port which is to extend over a period of 12 years from its inception three years ago, the first stage having been commenced in 1910.

The St. Mary's Current Project.

The most important of the many new works which will be carried out before the navigation season of 1913 closes, is that which will decrease the velocity of the St. Mary's current to within the safety margin for vessels navigating the harbor, and it is one that will reduce the necessity for the system of signalling by semaphores which was at once time considered by the former commissioners. The reduction of the current's velocity will be accomplished by dredging at the Guard Pier, to the south of St. Helen's Island also, and by the removal of the artificial works at Moffat's Island.

To Complete Dredging.

A good deal of dredging was accomplished last season in connection with the Guard Pier. This will be completed, and the south side of the pier, which is described on maps of the harbor as the East Quay Wall Embankment, will be continued so as to form a boot or curve which will have the effect of backing the volume of water immediately below the Victoria Pier, across the channel in the direction of Moffat's Island. This will render simultaneous compensatory works necessary, which will consist of the removal of the artificial works at Moffat's Island, and the continued dredging of the channel to the south of St. Helen's Island.

Last year, this channel was dredged for a distance of about a mile, between the island and Longueuil, to a depth of 20 feet at low water, and the work will be continued on similar lines for three quarters of a mile in the direction of Moffat's Island. The object of the enlargement of the south channel, and the removal of the artificial obstructions at Moffat's Island, is to diminish as much as possible the force of the St. Mary's current, which is, and has always been, considered the most difficult problem requiring to be solved in connection with the harbor.

The removal of the artificial works at Moffat's Island is alone estimated to

result in the reduction of the current by 15 per cent., and when the whole of the above plan has been carried out, it is believed that vessels will be able to navigate the current as easily and safely as though it were dead water. The safety of shipping navigating the harbor will have been secured as far as human foresight can accomplish it, within the limits of a single season, and that consideration alone is sufficient for the above works to be regarded as the most essential of all that are to be undertaken this year.

St. Lambert Embankment.

In connection with this work, the development of the embankment at St. Lambert will be continued with a view of its finally being incorporated in the harbor railway terminal system. The embankment at St. Lambert has been constructed with the debris taken by excavator buckets from between Moffat's Island and the opposite bank. Already the commissioners have a line of railway running along this artificial embankment from the Victoria Bridge to as far as the Moffat's Island excavation works.

Pier Extensions.

The increased length of steamers and the enhanced volume of the business carried on by steamship lines which use the Alexandra, King Edward and Jacques Cartier Piers render necessary the extension of these piers to a further distance of 250 feet. The commissioners feel that they would like to proceed with this work at once, but they are unable to do so until such time as the dredging at the Guard Pier shall have been completed and the locks at the entrance to the Lachine Canal altered.

Soundings and rock borings in connection with the latter project have been made recently, not only by the Harbor Commissioners, but also by the Department of Railways and Canals, acting independently. The commissioners realize, however, that nothing further can be done until the Government undertakes the work of altering the locks, for which no provision has been made in the estimates.

The necessity for extending these piers may be estimated from the fact that liners moored alongside often have their sterns projecting for a distance of from 50 to 75 feet beyond the end of the pier at which they are moored. This is not only obviously dangerous to vessels navigating the channel, but to the vessels moored at the piers also.

Sheds and Elevators.

A 15-ton electric freight hoist, capable of taking teams up to the second floors of the Allan and White Star sheds, is to be erected at once. Additions are to be made to grain elevator No. 1, which will

add 1,500,000 bushels to its capacity, so that when these additions are completed, it will total 2,500,000 bushels. Grain elevator No. 2 is to have completed the conveyer galleries leading from the elevator to shed No. 16 on the Victoria Pier.

Increase Quayage.

With regard to the extensions to the Victoria Pier, only one new length of quayage has, so far, been erected, viz., the one which extends for a distance of from 600 to 700 feet from the wharf so as to accommodate shed No. 16. Before the end of the approaching season, this length of quayage will have been completed, so that it will project to a total distance of 900 feet. Another length is to be constructed at right angles with it, which will not be completed until near the end of 1914. When finished, the latter will measure 1,800 feet, but, of this distance, only 800 feet will have been completed by the end of the present season. When the above extensions are all finished, they will provide accommodation on the outside for 5 ocean steamers. On the inside of the basin formed by the extensions, accommodation will be provided, at a low level, for river craft.

Wharf and Warehouse Construction.

Right opposite the Richelieu-Ontario berth at section 23, are the foundations for a large warehouse which were put in last year. The warehouse superstructure will now be erected, and, adjoining it, high level bulkhead wharves, suitable for permanent sheds. In 1911, the former commissioners constructed low-level wharves at the Richelieu-Ontario berth, to accommodate craft belonging to that line with slips to fit their hatches. In addition to these, there will now be erected high level wharves from section 23 to section 30, or from Beaudry St. to Papineau Ave., which will be capable of accommodating several big, first-class, ocean liners. Large sheds will be erected on these wharves, although not this year, but just as soon as the filling has sufficiently settled to permit of their erection.

The warehouse, which is intended to provide storage room for butter, cheese and other provisions, is an experiment which will be carried out along similar lines to the experiments of a like nature which have proved so successful in connection with the Bush Terminals at New York, and at several British and other European ports, notably at Bristol, Liverpool, and also at Hamburg.

It will be connected with the Harbor Commissioners' Railway, so that the necessity for carting will be reduced to a minimum and the dangers of loss from breakages will be almost eliminated. At the same time, the improvements to the

navigation of the harbor, including the lessening of the velocity of St. Mary's current, will enable provisions of a similar nature to be brought down all the way from the Lakes, through the canal and harbor, to the warehouses, and they will be lightered therefrom to ocean steamers, as is the custom in Dutch and German ports, where a perfect canal system permits of goods being lightered instead of being carted. The saving of cartage will be appreciated in Montreal as rates there rule exceedingly high when compared with those which obtain in many other ports. There will also be a welcome diminution of the present inevitable handling of perishable merchandise, with its many drawbacks.

Will Ballast Tracks.

The high level tracks which have been laid down from the Victoria Pier to the Racine Pier will be ballasted, trimmed, and made permanent this year. At Pointe aux Trembles, a wharf 500 feet long will be built for the Canada Cement Co., and other industries which are about to be established in that neighborhood. There is already a wharf at Longue Pointe, built by the former commissioners, and the railway will finally be extended from the Racine Pier, which is the present terminal, so as to connect with both these piers.

Of the four sheds which were commenced on the Tarte Pier in 1912, two were completed last year. One of them is leased to the Elder-Dempster Co., and the other to the Head Line. The remaining two sheds will be completed this year, one of them having already been leased to the New Zealand Shipping Co., while negotiations are now pending for the lease of the other.

Floating Dock Site.

Yet another very important work that will be finished this year is that in connection with the site of the floating ship dock, Duke of Connaught. The dry dock site will be completed to proper levels, so that the Canadian Vickers Co. can erect the large machine shops and ship repairing plant they have in view. The commissioners are even now having the ground adjoining the dock leveled. The wall adjoining the slipway is to be removed, and its disappearance will permit of the slipway being enlarged 100 per cent., which will enable ships to be constructed double the size of those for which the existing accommodation would suffice.

construction of an inner skin, port and starboard, from the tank top up to a point well above the water-line, and in the increase of the number and height of the water-tight bulkheads.

The wing boilers had to be removed to leave room for the riveters and platens to work at the inner shell; and to enable one of the boilers to be taken out of the ship, the forward funnel and uptakes were temporarily removed. The auxiliary machinery in the engine room and turbine room had also to be removed, likewise the ship's side valves and fittings, some of these valves weighing upwards of a ton. The ship was entirely dismantled for the time being, which, of course, entailed a considerable amount of alteration to the pipes and fittings generally, and the withdrawal of all the auxiliaries along the ship's side, including their seatings and fittings, whilst the placing of them, further involved additional labor.

It may be mentioned that, as an additional safeguard, an extra line of piping of large diameter has been fitted, running right through the ship, to enable all the pumps to draw through this medium in case of emergency, so that any compartment can be pumped out by any of the bilge or ballast pumps, which are so arranged that in case of the valves being inaccessible through any contingency, they can be operated from the upper deck.

The inner skin or shell is very strongly constructed in order to withstand extreme water pressure, if necessary. The frames are of heavy channel steel, and the longitudinals giving increased strength to the structure extend the entire length of the double skin. The inner shell or hull, as it might be called, consists, of course, of strong steel plating. The space between the outer and inner shells has been specially subdivided, both vertically and horizontally, by retaining the ship's original water-tight bulkheads out to the outer shell, and by the introduction of intermediate watertight vertical divisions between the two shells; while the top or crown of the structure and upper longitudinals have been specially fitted as watertight flats, so that each side of the ship has been converted into a series of watertight compartments. Thus, in the reconstruction carried out, the object in view has been to provide a margin of safety that cannot be surpassed.

Advantage has been taken of the time during which the vessel has been in the builders' hands to add still further to her attractiveness by the enlargement and re-decoration of the restaurant, while, adjacent thereto, a large cafe Parisien has been constructed. A reception-room in connection with the restaurant has also been pro-

vided; this adjoins the cafe Parisien and the first-class after entrance. Additions to the luxurious accommodation have also been made by the arrangement of a suite of state-rooms with bath-rooms and lavatories on the saloon and promenade decks, similar to those already in the ship; additional cloak-room accommodation is provided on the promenade deck.

SCOTTISH SHIPBUILDING.

A LARGE amount of new tonnage was turned out from Scottish shipyards during March, the total for the Clyde being the best for the month which has ever been recorded. Of the 29 vessels of 64,173 tons which were launched all over Scotland, 19 of 61,053 were waterborne on the Clyde. Notwithstanding the large output in March, however, the first quarter of the year closed with the figures considerably less than those of the corresponding periods of the two preceding years. This shortage was due to the very small output in January.

The Three Months' Output.

The following table shows the work done during the three months in the Clyde and East of Scotland:—

	Clyde.		Forth.		Tay.		Dee.	
	Ves.	Tons	Ves.	Tons	Ves.	Tons	Ves.	Tons
Jan. ...	5	9755	1	70	..	5	805	
Feb. ...	17	47050	2	2300	1	1000	4	903
Mar. ...	19	61053	3	1270	1	1100	6	750
	41	117858	6	3640	2	2100	15	2458

The work of the Clyde during the first quarter of each year since 1880 has been as follows:—

	March	Three Months	March	Three Months
	Tons	Tons	Tons	Tons
1913....	61,053	117,858	1896....	40,790
1912....	52,205	135,340	1895....	16,966
1911....	60,355	126,707	1894....	18,416
1910....	30,723	90,658	1893....	24,722
1909....	27,198	71,113	1892....	51,614
1908....	22,028	60,084	1891....	41,274
1907....	43,943	121,325	1890....	28,785
1906....	58,478	128,533	1889....	19,991
1905....	42,714	105,415	1888....	25,265
1904....	44,813	100,804	1887....	21,787
1903....	33,629	87,461	1886....	8,169
1902....	33,419	97,265	1885....	13,216
1901....	33,430	106,450	1884....	28,150
1900....	31,440	88,520	1883....	30,622
1899....	53,355	110,555	1882....	14,996
1898....	36,028	75,290	1881....	29,497
1897....	32,735	59,439	1880....	17,567

LAUNCH OF THE "CALGARIAN."

THE Calgarian, the latest addition to the Allan fleet, was launched at Glasgow on Saturday, April 19, Mrs. Andrew Allan naming the vessel, which is a sister ship to the Alsatian, launched a month ago.

Speaking after the ceremony, Mr. Andrew Allan said that as a Canadian he was not proud of the recent political disturbances in the Canadian Parliament over the Naval Bill. He, however, hoped the matter would be settled by the Canadian Parliament passing the donation of \$35,000,000, and that vessels for the Imperial navy would be built in Scotland on behalf of, and as a gift from, Canada to the Mother Country.

WHITE STAR LINER "OLYMPIC."

THE White Star Liner Olympic is once more in service, after leaving the works of Messrs. Harland and Wolff at Belfast, where, during the last few months, she has had an inner skin fitted. This work consisted in the

MARINE ENGINEERING OF CANADA

NORTH ATLANTIC ICE PATROL, 1913.

FOR the purpose of safeguarding lives and property at sea, the U.S. Revenue Cutters Seneca and Miami have been detailed to proceed to the vicinity of the tail of the Grand Banks of Newfoundland and establish a patrol of the ice fields and icebergs drifting down into those waters. The object of the patrol is to locate the icebergs and field ice nearest to the trans-Atlantic steamship lane. It will be the duty of patrol vessels to determine the southerly, easterly and westerly limits of the ice, and to keep in touch with these fields as they move to the southward, in order that radio messages may be sent out daily, giving the whereabouts of the ice, particularly the ice that may be in the immediate vicinity of the regular trans-Atlantic steamer lane.

The Seneca left New York on April 1 for this duty and arrived at the ice regions about April 6. Later, she will be relieved by the Miami, and during the months of April, May and June, and as much longer as necessary, these two vessels will patrol alternately, making alternate cruises of about 15 days in the ice region; the 15 days to be exclusive of time occupied in going to and from Halifax. The movements of the vessels will be so regulated that on the fifteenth day after reaching the ice region, the vessel on patrol will be relieved by the second vessel if possible, at which time the first vessel will proceed to Halifax, replenish her coal supply, and return in time to relieve the other vessel at the end of the latter's 15-day cruise. It is important that the patrol be continuous, and the vessel on patrol will not leave her station until relieved by the other, unless it is absolutely necessary to do so.

Ice Report Arrangements.

Having located the ice, the patrol vessel will send the following daily radiograms. All times in radiograms will be in 75th meridian time.

(a)—At 6 p.m. (75th meridian time) ice information will be sent broadcast for the benefit of vessels, using 600 meter wave length. This message will be sent three times with an interval of two minutes between each.

(b)—At 6.15 p.m. (75th meridian time) the same information will be sent broadcast three times in similar manner, using 300 meter wave length.

(c)—At 9 p.m. (75th meridian time) a radiogram will be sent to the branch Hydrographic Office, New York City, defining the ice danger zone, its southern limits, or other definite ice news and an endeavor will be made to communicate this message to the Newport or Boston Radio Stations. If unable to communicate with either of these stations direct, the message will be relayed to the New-

port Station through any convenient steamer. If unable to relay by steamer, the message will be sent via any Canadian or other radio station. If this radiogram is communicated direct to the Newport or Boston Station, or relayed to Newport by steamer, it will be preceded by the address "For Hydrographic." If it is necessary to send the message via a Canadian or other shore station, it will be addressed "Hydrographic, Maritime Exchange, New York."

(d)—Ice information will be given at any time to any ship with which the patrol can communicate.

Ice information will be given in as plain concise English as practicable, and will state in the following order:

- (a)—Ice (berg or field.)
- (b)—Date.
- (c)—Time (75th meridian time.)
- (d)—Latitude.
- (e)—Longitude.
- (f)—Other data as may be necessary.

While on this duty, the patrol vessel will endeavor by means of daily radio messages to keep ships at sea advised of the limits of the ice fields, etc.

The radio calls of the patrol vessels are as follows:

Name of ship	Call letters	Power in kilowatts	Wave length in meters
Miami	N R Q	2	300-600-725
Seneca	N R E	2	300-600-750

LAKE CARRIERS' ASSOCIATION.

FIREMEN on all ships of the Lake Carriers' Association will be divided into three watches, working 8 hours out of 24, and a new deck officer will be installed on all ships of 4,500 or more gross registered tons. The new officer will be known as boatswain, and will be paid \$5 a month more than a wheelman. He will assist the mates in handling the vessel in port, and will be in charge of the deck crew when the ship is outside.

The rearrangement of crews was decided upon at a meeting of the Board of Directors of the Lake Carriers' Association recently. Under the new scheme, on vessels carrying 6 firemen the men will break their own coal and do all other fire-hold work. Some of the larger ships have had 6 firemen working on the three-watch system for some time, but no ship has carried a boatswain. To house the extra help on some of the vessels it may be necessary to do away with the passenger quarters.

TO STOP AT QUEBEC.

AT the time the Alsatian was launched, a cable was received from Glasgow to the effect that she would sail on the Liverpool-Quebec-Montreal

route. Since the launch, further consideration has been given to the size of the Alsatian and her sister ship, the Calgarian, in comparison with the depth and width of the ship channel above Quebec. The result has been that an official announcement was made on April 2 to the effect that the new Allan liners would stop at Quebec, "for the present, at any rate." The meaning of the addendum may be that the new ships will dock at Montreal after the ship channel has been widened and deepened.

UNITED STATES SHIPBUILDING IN 1912-1913.

RETURNS received by the Bureau of Navigation indicate that the current fiscal year will show an output of American shipyards greater than for any of the past four years, and equal to the average annual output for any series of active years of construction. For the nine months ended March 31 the merchant vessels built in the United States and officially numbered, comprised 1,114 of 260,265 gross tons, compared with 1,051 of 151,341 tons for the previous corresponding nine months. As the spring and early summer are generally the season of greatest progress, the output for the year will probably reach 400,000 tons. Steel steamers built aggregate 151,507 tons, compared with 75,507 tons for the corresponding nine months a year ago. Shipbuilding on the Great Lakes shows little change, but the total output on the Atlantic seaboard has increased from 64,522 tons to 161,061 tons. Wood sailing vessels show a decrease, and form only a small fraction—11,971 tons, of the total.

DONALDSON BROS., LIMITED.

IT is reported that the owners of the Donaldson line of steamships, operating between Glasgow and Canadian ports, have registered themselves as a limited liability company with a capital of £200,000 in £1 shares. The registration embodies an agreement between members of the Donaldson family, the firm of Donaldson Bros., and R. M. Maclay, to carry on the company as a business for owning ships and managing steamship lines. The first directors, who are to number not less than three or more than seven, are Messrs. W. C. Donaldson, C. Donaldson, W. B. Donaldson, and N. P. Donaldson. As "Fair-play" remarks:—"The incorporation should set at rest the rumors that have been going around as to the Donaldson line having been acquired by the Grand Trunk Railway."

MARINE NEWS FROM EVERY SOURCE

St. Stephen, N.B.—The Eastern S.S. Company have purchased the Frontier Steamboat Company.

Levis, Que.—The first collier of the season from Sydney with a full cargo arrived here on April 14.

Kingston — The steamer Pierrepont broke through the ice jam to Cape Vincent March 27, and opened navigation.

Montreal, Que.—The water was let into the Lachine Canal on April 22, and navigation was open on the following day.

Ottawa, Ont.—Tenders for Kingston harbor improvements will be received up to April 30, by the Department of Public Works.

Sault Ste. Marie, Ont.—The Canadian lock opened its gates for the first time this year on April 14, when the car ferry St. Ignace passed up.

Levis, Que.—The steamer Natashquan left here at 7 a.m. on April 13, for Anticosti and the north shore. She took on cargo, passengers and mails at Quebec.

Sarnia, Ont.—The steamer Huronic, Capt. Campbell, of the Northern Navigation Co., left on April 23 on the first trip of the season for up-the-lake ports.

Kingston, Ont.—The steamer Antelope was put up for sale on March 27, under a commission issued by the Exchequer Court, but the price offered did not reach the reserve bid, and no sale was made.

Vancouver, B.C.—Mayor Baxter and W. A. Blair, secretary of the Board of Trade, were in Ottawa on April 16 to call on the Government re the establishment of a dry dock in Vancouver harbor.

Montreal, Que.—The steamer City of Montreal was damaged by fire while at her berth in the Lachine basin at Montreal. A nearby freight shed was destroyed and the flames spread to the boat.

Kingston, Ont. — Parties in Three Rivers, Quebec, have purchased the little steamer Jessie Bain from the R. & O. Navigation Co. This vessel was the smallest of the Thousand Island Steamboat Co.'s fleet.

London, Ont.—City Engineer Ashplant has been instructed by the Board

of Works to prepare a report on the cost and advisability of constructing a permanent breakwater for the protection of West London.

Toronto, Ont.—James Carruthers, president of the Richelieu and Ontario Navigation Company, denies the story that his company is about to take over other boat lines. They will build their own boats, he says.

St. John's Nfld.—With a catch of 36,000 seals, the steamer Stephano returned on March 20, being the first of the sealing fleet operators in Newfoundland waters to report.

Windsor, Ont.—For the 23rd consecutive year, the steamer City of Detroit II., of the Detroit & Cleveland Navigation Co. fleet, opened the season of navigation between Detroit and Cleveland on April 1.

Quebec, Que.—The steamer Natashquan left March 31 for Seven Islands, Anticosti and other Gulf ports, with passengers, mails and general cargo, being the first outward merchant steamer from here this season.

The Cabotia Steamship Co., Ltd., incorporated at Ottawa, as shipbuilders and engineers. Capital \$50,000. Incorporators:—C. A. Pope, Gregor Barelay, W. Bridges Scott, R. E. Moyse, and A. A. Wanklyn, all of Montreal.

Sarnia, Ont.—The old Lake Michigan, which has lain for some time at the mouth of the Black River, is being rebuilt. She is being fitted with new cabins, pilot house, etc., and will be placed in the lumber trade this season.

Trenton, Ont.—The Donnelly Wrecking Co., of Kingston, has succeeded in floating the dredge D. Stewart, which sank in Picton harbor. The Stewart was engaged in deepening the harbor at Kingston and is owned in Cornwall.

Windsor, Ont.—Large fog bells operated by water-power are being installed on the light vessels maintained at Limekiln Crossing, in the lower Detroit River, by the Department of Marine and Fisheries.

Toronto, Ont.—The dock at the east-end of the foot of York Street bridge, recently leased by the R. and O.

lines, is being remodelled to accommodate the boats of the Toronto-Hamilton line—the Modjeska and the Turbinia.

The River Lievre Navigation Co., Ltd., incorporated at Ottawa, to build steam and other boats. Capital \$50,000. Incorporators:—G. Bothwell, G. N. Bothwell, A. MacLaren, A. O. Anderson, and R. MacLaren Kenny, all of Buckingham.

Montreal, Que.—Mayor Michaud, of Maisonneuve, accompanied by Mr. A. Morin, counsel for the town, waited on the Harbor Commissioners recently relative to the establishment of a ferry service between Maisonneuve and Longueuil.

Ottawa, Ont.—A contract for dredging at Victoria Harbor was awarded to the Canadian Dredging Co. this month. Quinlan, Robertson & Miller have been awarded a contract for improvements in connection with lock No. 4, Lachine Canal.

Toronto.—Captain Maddock, of the steamer Dalhousie City, won the silk hat offered by the harbor master to the first captain to bring his vessel into port at the opening of the season.

Ottawa, Ont.—Tenders for a second-hand sea-going tug, 70 ft. long, 16 ft. beam, 6ft. draft, 100 tons displacement, and speed of 10 to 12 knots per hour, will be received by L. K. Jones, Asst. Deputy Minister of the Department of Railways and Canals.

Sarnia, Ont.—The first cargo of any nature to arrive at this port this season was brought in on April the 14th, by the steamer Hugh R. Harvey, which had a cargo of 500,000 feet of dry hemlock for the Laidlaw Co. This boat was loaded at Alpena, Mich., and made the trip down without trouble.

Sarnia, Ont.—The Reid Wrecking Company have a number of men and the steamer Manistique at work on the wreck of the City of Genoa. All the machinery and other parts of the boat that are worth anything will be removed, after which the wreck will be abandoned.

The Ojibway and Detroit Ferry Company, Ltd., incorporated at Ottawa, to build and operate a ferry between

MARINE ENGINEERING OF CANADA

Sandwich, Ont., and Detroit, Mich. Capital \$500,000. Incorporators:—R. J. McRae, Leslie H. Coombes, A. U. Gulliford, T. H. Kilgore, and Murray Gordon, all of Toronto, Ont.

New Westminster, B.C.—Orders for the construction of an immense grain elevator and milling plant at Port Coquitlam will be issued by Messrs. Davidson & Smith, of Fort William and Port Arthur, as soon as the Dominion Government announces its determination to erect elevators on the Pacific Coast.

Sarnia.—The license of Captain Charles Yates, of the steamer Alpena, of the Wyandotte Transportation line, has been suspended by the local steamboat inspectors of Port Huron for careless navigation of his boat on June 27, 1912, when he rammed and sank the steamer Sahara just off the mouth of the river in Lake Huron.

Capt. McLeod, of Collingwood, opened navigation on Lake Ontario between Toronto and Kingston this season, arriving at the latter port for overhaul. The steamer went to the dry dock. From Kingston, the steamer will go to Ogdensburg and during the summer will be in the pulp trade between Thorold and the Gulf of St. Lawrence.

Lake Vessel Insurance.—Underwriters have made $4\frac{3}{4}$ per cent. the rate for insurance on steel steamers this season, effective from April 15th. This is one per cent. lower than last year. The new rate is made for steamers plying on the Upper Lakes, but vessels trading between Lake Erie and Montreal are subjected to a 2 per cent. extension.

Toronto, Ont.—The specifications for the harbor were completed by Engineer Cousins recently. Many prominent contractors in Britain and the United States, it is said, wish to submit tenders for the work, and if the figures are low enough, the Board will abandon its plan to do the work itself. The work is to be commenced by the middle of July.

Kingston, Ont.—Capt. A. R. Hinckley, of Oswego, N.Y., who had been at work on the sunken steamer Island Belle, at Alexandria Bay, succeeded in raising the craft. It is not believed that much time will be required to place the vessel in running order again so that she will soon be in condition to make her usual runs between Ogdensburg and Alexandria Bay.

Collingwood, Ont.—The steamers Newona and City of Naples, which arrived here, April 21, are now receiving repairs in dry dock. Good progress is being made with the large bulk freighter which is being constructed by the Collingwood Shipbuilding Co. for the Chi-

cago and St. Lawrence Navigation Co. This steamer will be launched within the next few weeks.

Vancouver, B.C.—"In view of the increasingly large steamships which will visit this coast after the opening of the Panama Canal, it is imperative that a drydock be built without any further delay," said Mr. E. J. M. Nash, special representative for Canada and the United States of the Royal Mail Steam Packet Company of London, England, recently at Vancouver.

New Westminster, B.C.—The Canadian Northern Railway Company is planning the construction of two large ferry terminal docks at Woodward Slough on Lulu Island, to handle their Vancouver Island freight and passenger car ferry service. Each will have three tracks. For handling the freight business three scows with three tracks each will be constructed, to be towed to Vancouver Island by tugs.

Toronto, Ont.—The R. & O. have opened new offices on the Yonge Street wharf at a cost of about \$2,500. This move means at least that the offices on the dock will be the head offices of the company for freight in the city. The passenger department will, it is understood, retain their offices in the Traders Bank Building. Vice-president Playfair and Manager Gildersleeve will have offices on the dock.

Montreal, Que.—W. A. Black, of the Pickford & Black Steamship Co., says that four steamers are to be provided for the new fortnightly service between St. John and Halifax and Bermuda, St. Kitts, Antigue, Monserrat, Dominica, St. Lucia, Barbados, St. Vincent, Trinidad and Demerara. The four new boats which will be in commission within two years, are to be about 4,500 tons dead weight each.

Fredericton, N.B.—A company composed largely of Fredericton men, and headed by Ald. E. G. Hoben, closed a deal on March 22, for the purchase of the steamer Hampstead from the St. John River Steamboat Co. The price paid for the steamer is said to be between \$3,000 and \$5,000. She will be renovated and properly fitted up in time to go on the Fredericton-Gagetown route the coming season.

North Bay, Ont.—The Government breakwater under construction in North Bay Harbor, Lake Nipissing, has been almost completely destroyed by the ice breaking up and shoving shoreward. Propelled by a strong south-west wind, great masses of ice, two feet thick in places, crashed into the structure. Heavy piles and timbers snapped like pipe stems, the whole winter's work being demolished in a few hours.

Ottawa, Ont.—The Dominion Government awarded contracts to the Thor Iron Works of Toronto for the construction of two steel barges and two scows, to be used on the harbor works at the terminus of the Hudson Bay Railway. The cost will be \$18,500. As soon as constructed, these barges and scows will be sent to Hudson Bay with a dredging plant, and work on the harbor and docks at Port Nelson will be commenced.

Parry Sound, Ont.—The work of fitting out the Dominion Government steamers Simeoe and Lambton which are lying at Parry Sound has been commenced by order of the agent of the Marine Department there. Captain Rich. Smith, who last year was in command of the steamer Lambton, has been promoted to the command of the Simeoe, and Captain Alex. McNab, who was first officer of the Lambton last year, has been promoted to the command of that steamer.

Sarnia, Ont.—The first boat to make her way through from Lake Erie to Lake Huron this season was the car ferry Ste. Marie, which passed Sarnia shortly after six o'clock on Friday evening, April 14, bound for the Straits of Mackinac, where she will be stationed. The vessel is but recently out of the Toledo shipyards, and this was her maiden trip. Capt. Graves, in command, stated he encountered ice thirty inches thick from Presque Isle northward, but experienced no trouble.

Owen Sound, Ont.—The loss on the steamer Manitou which was partly burned at Owen Sound, has been adjusted by Mr. Hugh Calderwood, of Barrie, representing the owners, and Capt. Smith, of Cleveland the marine underwriters who carried the risk. The amount of damage was found to be quite extensive and will involve a considerable outlay for repairs. Mr. Robert Morrill, shipbuilder, of Collingwood, will have charge of the repairs and overhaul. Work will be commenced at once.

St. John's, Nfld.—The British steamer Scotia, which has been commissioned to patrol the North Atlantic as an ice patrol during the spring and early summer months in conjunction with the United States revenue cutters, put in here on April 14 for coal after a three weeks' tour of duty on the Grand Banks. Although ice has been reported at several points off the coast, the Scotia sighted no bergs in the steamer lanes. After replenishing her bunkers, the Scotia proceeded northward.

Ottawa, Ont.—The position of the front range lighthouse at Corunna, St. Clair river, has been changed, modifying the axis of the lights in such a way as to enable vessels to give a wider berth to Stag Island. The Department of

Marine and Fisheries announces that the new position of the front range lighthouse is 17 1-3 feet eastward of the old site, 568 feet 347 degrees 15 minutes (north nine degrees 45 minutes west mag) from the back range lighthouse in latitude north 42 degrees 53 minutes 11 seconds, longitude west 82 degrees 27 minutes and 21 seconds.

New Westminster, B.C.—The contract for the construction of the new ferry boat for the West Vancouver Ferry Company Limited has been awarded to Captain Wessel of Vancouver. The boat will be 80 feet in length, with a beam of 15½ feet, and will be equipped with the latest type Atlas engines, 80 h.p. The contract is dated April 2nd, and calls for the delivery of the boat on June 11th.

New Westminster, B. C.—Crane & Hampton, shipbuilders, who were formerly located on Lulu Island, where they sold their site, and who were promised another site by the city last year, which site, however, was found to be needed for the Heaps Co. foundry, applied recently to the council for a temporary tenure, it being understood that they would move on one month's notice. The firm wishes to carry on business here while seeking another site, which may be available from the city when the plans of the harbor committee are completed and the distribution of water lots is made.

Port Arthur, Ont.—May 24th, Victoria Day, has been selected as the date for the launching of the Northern Navigation Co.'s new flagship from the yards of the Western Drydock and Shipbuilding Co. It is the intention of the shipbuilding company and the navigation company, in collaboration, to make the occasion memorable by the greatest celebration ever held at the head of the lakes. This celebration will be fitting by reason of the fact that this will be the first passenger steamer to leave the ways in Port Arthur, a steamer which will be the finest Canadian owned boat on the Great Lakes.

Vancouver, B.C.—Secretary Blair, of the Board of Trade has received a letter from the United States manager of Furness, Withy & Co., asking for information regarding this port, the amount of tonnage handled, the class of shipments, and what was looked forward to in connection with the opening of the Panama Canal. It is explained in the letter that this information is to be forwarded to the chairman of the company in England so that he may have some advance information previous to a visit that he and some of his associates propose to make to Vancouver with a view to establishing a line of steamers.

Detroit, Mich.—In the decision just rendered by Judge Tuttle of the United

States Court, responsibility is placed solely with the steamer S. S. Curry for the collision of June 23 last year, in which the Canadian steamer Bothnia was sunk in the St. Clair River just above Star Island. Judge Tuttle's decision was given immediately after the attorneys had completed their argument in the suit of the Meaford Transportation Co., owners of the Bothnia, against the Hawgood & Avery Transit Co., owners of the Curry, for \$28,000, the amount of damages claimed as resulting from the loss of the Bothnia, her cargo and the belongings of her crew.

Sarnia, Ont.—The decision of the Port Huron local inspectors, charging Capt. Wm. H. Yates, master of the steamer Alpena, of the Wyandotte Transportation Company, with reckless navigation at the entrance of the St. Clair River, on June 27, 1912, for which his license as master and pilot was suspended for fifteen days, was revoked to-day by Capt. C. H. Westcott, supervising steamboat inspector of the district. After the decision of the local inspectors of Port Huron was rendered, Capt. Yates appealed to Capt. Westcott. In making the ruling, Capt. Westcott said that after carefully considering the testimony submitted by him, he had reached the conclusion that the evidence did not justify the charge of reckless navigation.

Toronto, Ont.—The Harbor Commissioners on April 15 sanctioned the lease of the docks on Harbor Square, under the supervision of the Board, to the Richelieu & Ontario Navigation Co., at a rental of \$13,000 a year, which is \$2,200 more than last year. These docks were occupied by the Merchants-Mutual and the Canadian Lake lines last season. This year the R. & O. Co. will use them for their freight steamers, also one of them for the excursion steamers plying on the Toronto-Hamilton route. The two docks are to the west of the wharves of the Toronto Ferry Co. The Commissioners also decided to make extensive improvements on the ferry wharf at Centre Island, which is in a bad condition. An appropriation of \$2,500 was made for this work.

Detroit, Mich.—Plans for merging seven lake transportation companies, comprising in all 39 vessels, under one control have progressed to a point where it is now practically assured that the deal will be completed. The plan involves the taking over of vessels of other companies by the Lackawanna Steamship Co., and its reorganization as the Interlake Steamship Co., with a capital stock of \$6,500,000, and bonds of \$3,000,000. Of the capital stock \$4,585,680 is to be issued in exchange for properties of the Mesba Steamship Co., comprising 4 vessels; the Lackawanna Steamship Co.,

7 vessels; the Interlake Co., and Huron Barge Co., 2 vessels each; the Provident Steamship Co., and Acme Steamship Co., 3 vessels each, and Standard Steamship Co., 1 vessel. The fleet will include also 17 of the former vessels of the Gilchrist Transportation Co., which were bought out by a creditors' committee, making 39 vessels in all. It is proposed that the new corporation shall carry its own insurance on the vessels, which are to be under the management of Pickands, Mather & Co., Cleveland.

Personal

Henry J. Turner, Buffalo, has been elected vice-president of the Chadwick Brass Co., Hamilton, Ont.

H. J. Hamilton, Toronto manager for Drummond McCall & Co., returned this week from a trip to Florida, after an absence of several months.

J. W. Canvin, formerly district passenger agent of the Richelieu & Ontario Navigation Co. at Alexandria Bay, has been promoted to the position of advertising agent of the company, with headquarters at Montreal. In addition to having full charge of the publicity department, Mr. Canvin will also have jurisdiction as passenger agent in the Atlantic coast cities and east of New York.

Robert Cooney, St. Catharines, Ont., one of the best known lake captains, dropped dead recently as he was leaving Dr. James White's office on Cannon St. He had been ill for some time, but had just finished telling the doctor how much better he was feeling when death overtook him. For years he sailed the Macassa when she was first put on the Hamilton-Toronto run. The past few seasons he has been in command of the Dundurn.

Gustav W. Wolff, one of the founders of the great shipbuilding firm of Harland and Wolff, at Belfast, died recently, aged 79. He served eighteen years in Parliament. Five years ago he retired from active business. He was the son of Moritz Wolff, a merchant of Hamburg, and was born there in 1834. He was educated in Hamburg and at Liverpool College, and served an apprenticeship as engineer and shipbuilder with Whitworth and Company, of Manchester. Later he entered the service of Goodfellow and Company, of Hyde. In 1860 he joined the late Sir Edward Harland, of Belfast, starting the famous shipbuilding and engineering firm of Harland and Wolff. Belfast East was the constituency he represented while in Parliament, from 1892 to 1910 as a Unionist.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Victor Gray has been appointed purser of the N. N. Co.'s steamer *Waubie*.

Arnold Potter, formerly baggage-master on the S. S. *Yarmouth*, has been promoted to the office of purser.

Admiral Togo, the naval hero of the Russo-Japanese War, was promoted, on April 21, admiral of the fleet.

Wilfrid Stanley Strong, of *Brighton, Ont.*, has been appointed wharfinger of the Government wharf there.

Angus Winchester, son of Mr. Charles Winchester, of Digby, N.S., has resigned his position as purser of the S. S. *Yarmouth*.

W. Grant Morden, a director of the Richelieu and Ontario Navigation Co., has been elected a director of the Collingwood Shipbuilding Co., Collingwood, Ont.

Captain William Milner, for nearly thirty years a retired mariner, died at Sackville, N.B., on March 30, at his home. Captain Milner was in the eighty-second year of his age.

Edwin E. Horsey, of the Lake Ontario and Bay of Quinte Steamboat Co., has been appointed assistant to H. H. Gildersleeve, manager of Western lines for the R. & O. Navigation Co.

Kaministiquia's officers.—The Western Navigation Co. has appointed the officers to its steamer *Kaministiquia* as follows:—Captain, E. L. Stephen; first officer, William Darling; chief engineer, H. Young.

Captain William Benyon, who for the past thirty-six years has been a well-known member of the Victoria shipping community, passed away recently, aged 64 years. Captain Benyon was born at Swansea, Wales.

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.

President—James Playfair, Midland; **Council**—F. King, Kingston, Ont.

GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

Chairman—W. F. Wasley, Gravenhurst, Ont. **Secretary**—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.

President—A. A. Heard, Albany, N.Y. **Secretary**—M. R. Nelson, New York. . . .

THE SHIPPING FEDERATION OF CANADA

President—A. A. Allan, Montreal; **Manager and Secretary**—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; **Grand Secretary-Treasurer**—Capt. H. O. Jackson, 376 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

James T. McKee, 268 Douglas Avenue, St. John, N.B., **Grand President**.
Thos. Theriault, Levis, P.Q., **Grand Vice-President**.

Neil J. Morrison, P.O. Box 238, St. John, N.B., **Grand Secretary-Treasurer**.
Jno. A. Murphy, Midland, Ont., **Grand Conductor**.

George Bourret, Sorel, P.Q., **Grand Door-keeper**.

Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.

Grand Auditors.

C. J. Smith, who recently resigned the management of the Richelieu and Ontario Navigation Co., has accepted the vice-presidency and general management of the North Railway and Hudson Bay Steamship Companies.

Capt. W. R. Wakely, a sailor on the Great Lakes from his boyhood days, died in Toronto recently, in his fifty-ninth year. He was born in the vicinity of Port Hope, and comes from a family of sailors.

Captain Harrison, who was in charge of the C.N.R. liner "*Royal George*" when she foundered in the St. Lawrence above Quebec last fall, and whose certificate was suspended, has, we understand, succeeded in having the judgment of the Canadian Court quashed.

Capt. George Ross, one of the best known marine men along the Welland Canal, died recently at his residence, Port Robinson, aged sixty-three years. He was born in Canada, and resided nearly all his life at Port Robinson, being engaged in the tug business on the Welland Canal.

Col. Lamb, engineer in charge of marine matters from Port Bruce to Kin-cardine, has been in Sarnia with his assistants on work in the St. Clair River near the mouth. This work is preliminary to new charts of the river bottom at this point, which are made necessary by vast dredging operations.

Capt. Matthew Patterson, of Kingston, Ont., died on April 31, aged eighty-one years. Deceased was looked upon as being the oldest marine captain in Canada, having sailed the ocean and the great lakes for seventy-two years. He was born in England, and came to Kingston sixty years ago. Last season he

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto.	1	A. J. Fisher,	490 Concord Ave.	E. A. Prince,	61 Elm Grove, Toronto.
St. John,	2	J. F. Matthews,	50 Douglas Ave.,	G. T. G. Blewett,	65 Harrison St., St. John, N.B.
Collingwood,	3	Andrew Kerr,	Box 343, Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3208 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex McNiven,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	A. S. DeGruchy,	Room 23, Williams Bldg.,	E. Read,	859 Thurlow St.
Levis,	8	Helme Mercier,	Riverville, Levis,	S. G. Guenard,	Bienville, Levis, P.Q.
Sorel,	9	Geo. Bourret,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	H. W. Fletcher,	636 4th Ave. East,	E. J. Riley,	1030 1st Ave., Owen Sound, Ont.
Windsor,	11	Alex. McDonald,	Windsor, Ont.,	Nell Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,	Midland,	Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault S. Marie,	14	Thos. O'Reilly,	Sault Ste Marie,	Geo. S. Biggar,	Sault Ste Marie, Ont.
Charlottetown,	15	J. K. Sutherland,	Charlottetown, P.E.I.,	Lem Winchester,	302 Fitzroy St., Charlottetown, P.E.I.
Twinn City,	16	Arthur Abbey,	Fort William, Ont.	John A. Smith,	Fort William, Ont.

sailed the schooner St. Louis, and was preparing to handle her again this year.

Marine Engineers Meet.—There was a big attendance at the meeting of marine engineers, held at Campbell & Gibbons' hall, Port Arthur on April 9. Amongst those present were a large number of visiting engineers who were then assembled in the twin cities preparing their vessels for the navigation season. Music and speeches formed the program, which made the evening a pleasant one. Arthur Foote, mechanical superintendent of the Western Drydock Co., gave an interesting address on engineers and their profession.

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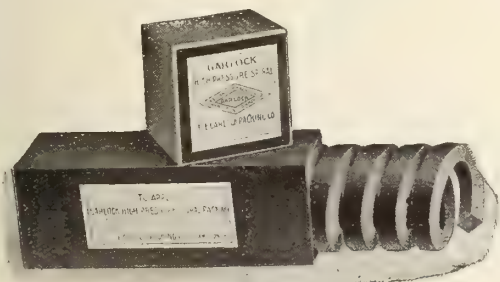
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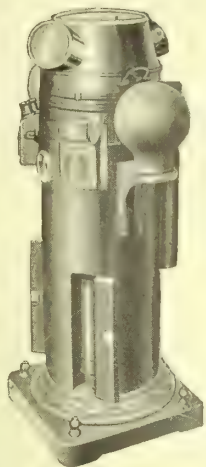
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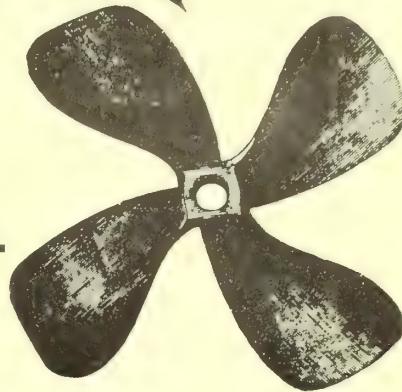
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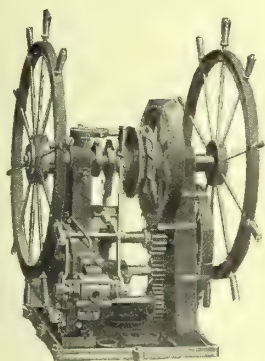
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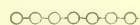
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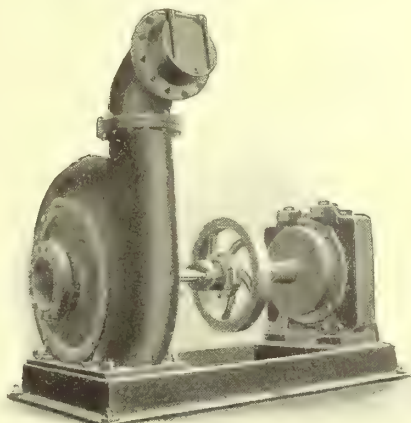


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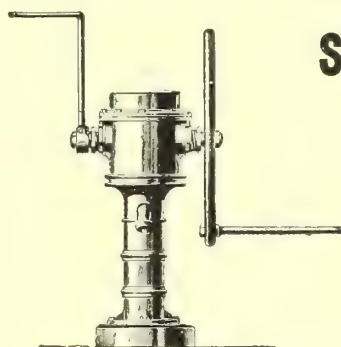
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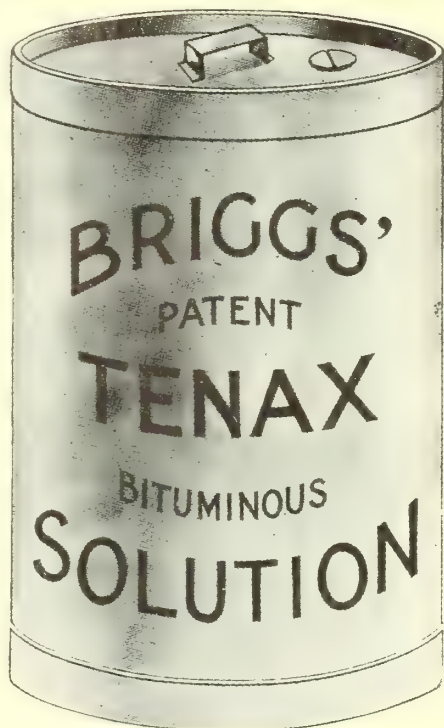
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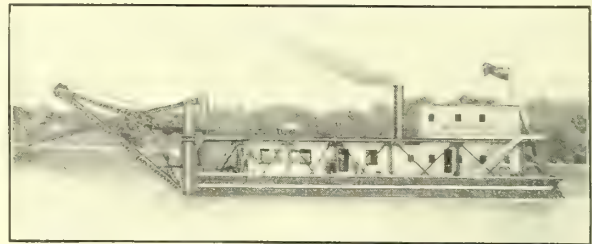


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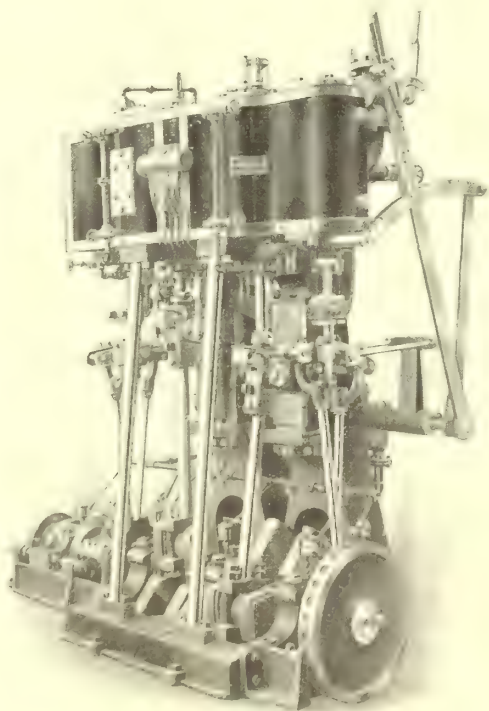
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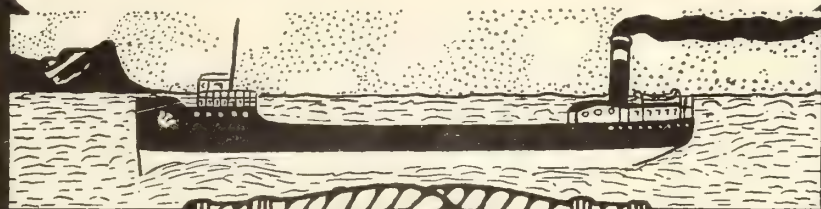
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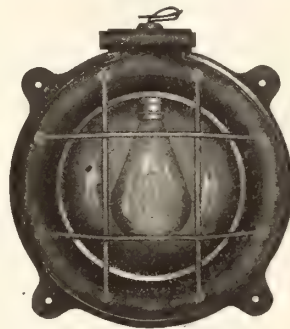
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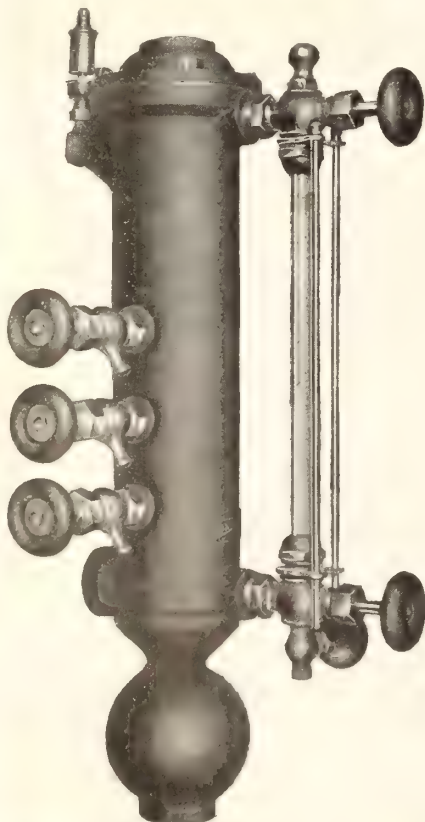


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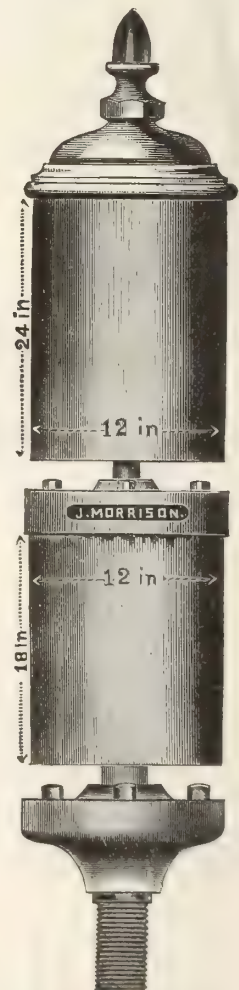
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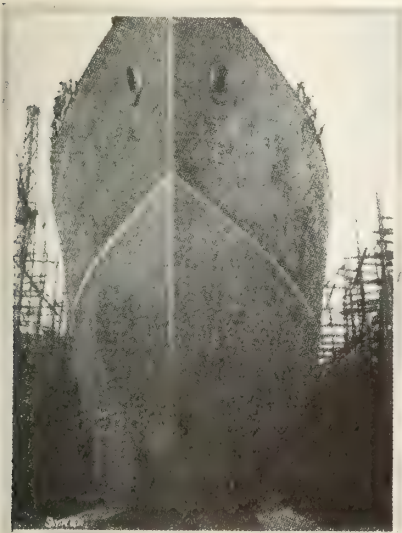
Launch and Description of Cunard Steamship "Andania."

The popularity of the St. Lawrence Route and the increasing freight and passenger transportation between Europe and Canada are responsible for the appearance of the Cunard Line as a competitor for a share of the business offering. The vessel described in this article will rank with the many fine examples of naval architecture and marine engineering of other lines, in the feature of comfort, speed and general appointments.

ON Saturday, March 22, the first of three new vessels for the Cunard Canadian service was put into the water at Greenock on the Clyde. Named the Andania, she has been constructed by Scott's Shipbuilding and Engineering Co., in whose yard—then under dif-

some time to come, at any rate, however, Greenock will have steamers for the great Liverpool company in hand, for, on the berth from which the Andania was launched, there will be laid down the

two classes of accommodation only, second cabin and third-class, provision being made for 520 passengers in the former, and 1,620 in the latter. The propelling machinery consists of two sets



THE "ANDANIA" BEGINNING TO MOVE.



NEARLY OFF THE WAYS.



WATERBORNE.

NEW CUNARD CANADIAN LINER "ANDANIA."

ferent management—the Britannia, the first steamer owned by the Cunard Line, was constructed in 1840. From that date to the present, only one other Cunard boat has been launched at Greenock, namely, the Columbia in 1852. For

Transylvania, while alongside, the Andania is taking shape.

Like the last named vessel, the Andania is of 13,000 tons gross, with a length of 540 feet, a breadth of 64 ft., and a depth of 46 ft. She provides

of quadruple expansion engines, balanced on the Yarow, Schliek and Tweedy principle, and developing 8,000 i.h.p.

The vessel has been built to Lloyd's highest class, and is on the shelter deck type, with long bridge, promenade and boat decks above. Nothing is being spared by the Cunard Co. to make the quarters of both classes of passengers as comfortable as they can be. The dining-rooms for both are high up in the vessel, and extend right across the ship; between them, following a practice now general on up-to-date liners, are the kitchens and serving rooms, which arrangement, it is hardly necessary to point out, is of the greatest convenience to those responsible for the expeditious working of the catering department. The decorative scheme, throughout, promises to be something well above the average for a vessel of this class, there being, in addition to a smoking and a writing room, luxurious innovations in the shape of a lounge and a gymnasium; while all the second-class cabins will contain dressing-tables, wardrobes, and basins supplied with running water. The third-class passengers



NEW CUNARD LINE STEAMSHIP "ANDANIA."

will be berthed in cabins, many of which are of the two-berthed variety, though in the majority there are four or six berths.

The provision of large bilge keels should make the vessel very steady at sea, and among the details of her equipment, it may be noted that she has a full provision of bulkheads and watertight doors, a Marconi wireless installation, a submarine signalling apparatus, spare dynamo in the event of the ordinary electric lighting power failing, and sufficient boats to carry every person on

SHIPS AND SHIPPING.

MR. Francis Henderson, of the Anchor Line, whose experience of shipping extends over forty years, has been lamenting, in an after dinner speech, the lack of beauty which distinguishes the modern steamer. Formerly, he says, vessels were all goodly to look upon. Steamers had masts and funnels raked aft, the masts had yards, and sail was invariably used. Now, they have straight funnels and masts, if they have them at all, and yards and sails have gone for good. There would, of course,

derson, however, was not confining his remarks to such cargo-carriers.

The liner apparently comes equally under his lash. To the public, there is consolation in the thought that, if steamers do not appear destined to grow in beauty, they were never more comfortable. It may be, as Mr. Henderson suggests, that luxury on shipboard has been carried to an extreme point, but it can hardly be doubted that if the ocean traveler had to make his choice between exterior charm and internal elegance, he would give his vote for the latter.

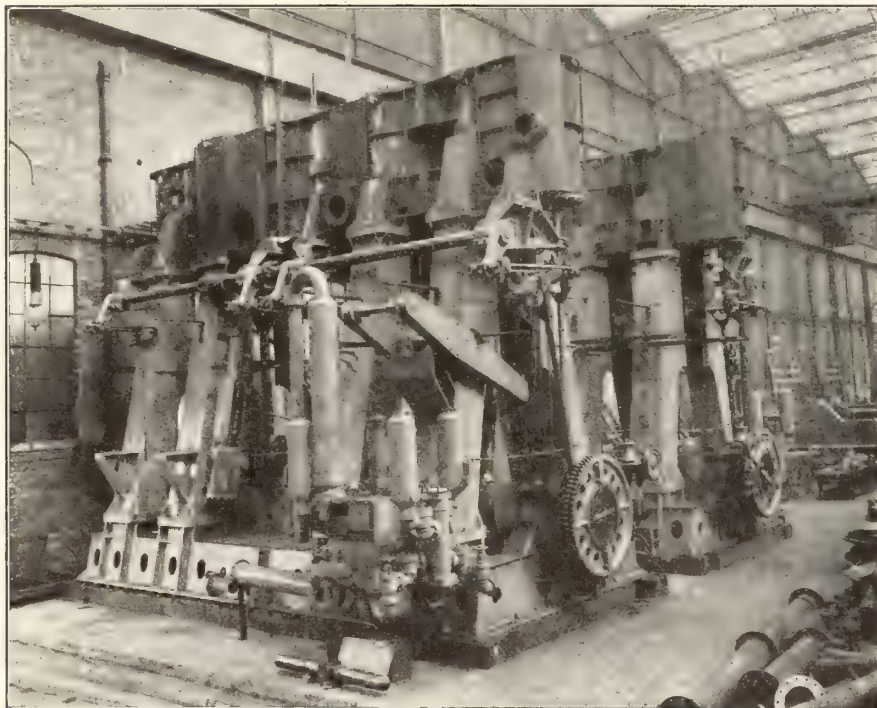
The Shipbuilding Boom.

The large amount of tonnage at present under construction must no doubt be accounted a sign of the healthiness of the shipping trade, but to the mind of an experienced shipowner like Mr. Henderson the future of the industry, because of this very shipbuilding activity, holds its special problems. Ships, he points out, now cost much more to build, and considerably more to operate. He puts the advance in the cost of stores at 30 per cent., and the increase in wages, one way and another, at little short of \$15,000 a year in the case of a 7,000-ton steamer. This means, of course, that the shipowner now puts more capital into ships, and incurs heavier working costs in order to do pretty much the same amount of work as previously, and that his profit must therefore depend upon the maintenance of higher rates of freight than formerly obtained. Mr. Henderson's view is that when the whole of the vessels now under construction are delivered the shipowner will require all his customary energy, ability, and thrift to meet the new situation.

It is difficult to challenge such an opinion, because in the long run the new tonnage must tell, even though much of it consists of special types of vessels, such as oil tankers. On the other hand, it is not to be overlooked that the shipping trade is on the eve of a great event which may help to neutralize what is known as overbuilding. The opening of the Panama Canal, with the new trades which it will inaugurate and the new markets which it will render accessible, has in it the possibilities of a demand for tonnage which may well tend to protract the present period of shipping prosperity. Meanwhile, freights keep steady, and strikes, which ate away a good deal of profit last year in the shipping trade, are almost conspicuous by their absence.

Canadian Rate War.

There has been no serious extension of the dispute between the North Atlantic Pool and the Canadian Pacific Railway Co. The Canadian emigration sea-



QUADRUPLE EXPANSION ENGINES OF THE "ANDANIA."

board. Altogether she is a worthy representative of the Cunard fleet—well-built, well-found, and with no expense spared where the comfort or safety of the passengers is concerned.

The ceremony of naming the ship was performed by Lady Inverclyde, and within a very short time—about 1 min. 40 sec.—from the moment the hull began to move, the vessel was riding gracefully on the water. Subsequently, the guests repaired to the shipbuilding company's offices, where Mr. C. C. Scott invited them to drink to the success of the new ship and of the Cunard Co. Mr. M. H. Maxwell, a director of the latter undertaking, briefly replied, after which Mr. Scott presented Lady Inverclyde with a silver casket containing the scissors which her ladyship used at the launching ceremony. Later, at the Central Hotel, Glasgow, a large party sat down to luncheon, Mr. Maxwell being in the chair.

be many more mastless steamers but for the demands of wireless equipment and the need for carrying masthead lights. At one time it was said to be in contemplation to provide the mammoth Olympic with but a single pole-mast. With the increasing use of internal-combustion engines in ships, a row of smokestacks even in very big steamers may obviously be no longer required in the near future. Mr. Henderson's point is, that appearances are not considered at all, and that utility alone is the order of the day.

Present Day Features.

This is especially true of certain classes of ships. It is to be feared, for instance, that the tramp steamer, which was never a thing of beauty, has at no time been built on more severely utilitarian lines than to-day. The derricks with which so many cargo-carrying steamers are provided are valuable time-savers in port, but they do not add to the appearance of the vessel. Mr. Hen-

son has already opened, but it is quite clear that there is to be a "cut" in rates, not only from Trieste, but also from Antwerp. This policy apparently does not meet with entire approval in Germany, for the reason that the cheaper the rates in the Dominion the better it is for the Canadian Pacific. Its interests, that is to say, are better served by a large influx of labor into Canada than by the carriage of emigrants at normal rates in its own ships. The circumstance suggests that this is a case in which the ordinary weapon of a combination of shipping companies, namely, a reduction of rates, is worse than useless. The German view is that it would be better, if possible, to strike in some indirect way at the interests of the Canadian Pacific by sending traffic to ports which are not within the company's sphere. In this connection a desire to help the Grand Trunk is particularly mentioned.

Canadian ports, however, are rather limited in number, and if, as is definitely stated, the Allan Line has withdrawn from the Pool, it is conceivable that a policy of "divide et impera" may not be altogether applicable to the particular case. To the student of the subject of steamship combination, the present dispute over the right of the Canadian Pacific to start a line from Trieste presents features which are specially interesting because the conditions are so unusual as to be practically abnormal. We have seen contests between steamship companies, but we have seen no contest between a number of European steamship lines and a great Canadian railway company, which is only incidentally a steamship owner.

So far the Canadian Government has taken no hand in the dispute, but that is a contingency which is not to be altogether overlooked. The Austrian Government is also a factor in the situation. It is apparently not content with a position under which some 80 per cent. of the emigration from Central and Northern Europe passes over the German railways to North Sea ports.

Colonies and Liners.

Passed by the Federal Parliament, the Australian Navigation Act has been reserved for the King's approval. This inevitably means delay in connection with a measure that will not be without some effect on British interests. Generally speaking, the Act regards shipping between Australian ports as of the nature of coasting trade. It is true that power is given to the Governor-General to declare that cargo and passengers carried in British vessels between Australian ports may not be deemed to be coasting trade, but this is interpreted as no more than putting the policy as to British vessels in the hands of the Min-

ister of Customs. It is thought that if they trade between Commonwealth ports British steamers will have to pay the Australian rate of wages between those ports. Thus, the Peninsular and Oriental Co., who employ Lascars, would have to pay them at current Australian rates, and settle their accounts before the ship finally leaves Freemantle for home. The Orient Co., again, would have to make up to their white crews the difference between their ordinary wages and the current Australian wages between Commonwealth ports.

Whether one of the objects is to try and keep British and other lines from carrying cargo and passengers between Australian ports is not quite clear. Anyhow, the foreign lines, with their lower rates of wages, will find the leveling-up process rather expensive. Moreover, the Act refuses permission to any foreign line to engage in Australian coasting trade at all, if it has during the preceding twelve months received any subsidy, direct or indirect. This provision certainly cannot be described as unfriendly to the British lines. The Act has a good deal to say about accommodation for officers and seamen, and the necessity of providing bath-rooms for stokers. It also requires that where there is no library for seamen's use, they shall be at liberty to borrow books from the ship's library. In this way it assures the creation of special libraries for sailors. The Act also contains provisions with respect to the compulsory equipment of ships with wireless telegraphy.

Turbined Cargo Boats.

One of the most interesting passages in Mr. Noble's speech at the Cairn Line meeting concerned the question whether the geared steam-turbine or the internal combustion engine has the best chance of adoption in cargo boats. The Cairn Line undoubtedly took a bold step when it decided to equip the Cairnross with geared turbines. Mr. Noble now gives the results of comparative trials between her and the sister-ship Cairngowan, the latter fitted with triple-expansion engines. Both vessels were furnished with bunkers from the same colliery, and in every other respect were rendered as nearly identical as possible. For thirty-six hours they were run side by side at full-power in the Bristol and English Channels, an observing staff being placed on board each steamer. The main point was, of course, to determine the relative consumption of fuel, and it is now intimated that the expectation that the boat with geared turbines would prove the most economical was fully realized.

Thus far it would appear that geared turbines are superior to triple-expansion engines, but what of internal combus-

tion engines? Mr. Noble's statement is that a geared turbined steamer, with coal at \$3.65 per ton, will hold its own against the oil engine, with oil at about \$9.00 per ton, or less than half its present price. He claims, therefore, that a vessel like the Cairnross has little to fear for a long time to come from the competition of the oil engine. This opinion appears to confirm the view that the future of the internal combustion engine on shipboard may be largely dependent on the question of oil prices. It is for this reason, perhaps, that the British ship-owner is at present disposed to fight shy of it. If anything, the experiment of the Cairn Line certainly seems to justify a waiting attitude, but in no sense an attitude of indifference.



ELECTRIC PROPULSION OF SHIPS.

WHETHER the new vessel Tyne-mount, launched recently from the yard of Smith's Dock Co., Middlesbro, England, will inaugurate a new epoch in ship propulsion or not, time will tell, but at present, when so much is being said concerning the adoption of the Diesel engine for marine service, this vessel is certainly of special interest. As yet but little experience of electrical transmission in marine installations is available, for, as a matter of fact, the Tyne-mount is about the first large vessel of her class to be turned out. Nevertheless for certain conditions, as, for example, the Canadian Lakes trade, where the largest and coarsest pitched propellers running at a slow speed are desirable, this system of propulsion seems to have its advantages.

General Particulars.

The Tyne-mount, which has been built for the Montreal Transportation Co. for service on the Great Lakes, is a vessel of 250 ft. in length by 42 ft. 6 in. beam by 19 ft. moulded depth, and has a deadweight carrying capacity of 2,400 tons. The electricity for driving the motor coupled to the propeller shaft is generated by two 300 b.h.p. Diesel engines of the Mirrilees, Bickerton & Day type, while the complete electrical installation, consisting of alternating current dynamos, motors, switch gear, etc., is by Mavor & Coulson, Glasgow. The prime movers or Diesel engines run at 400 r.p.m., while the propeller shaft has a speed of but 80 r.p.m.

Propelling Machinery Features.

For this installation claim is made that it provides a means for applying the power of one or any number of engines to one or more propellers so that the power generating units, each consisting of a Diesel engine with its own

generator, may be situated in any part of the vessel, each working independently. By this system, Diesel engines of different types and widely differing speeds of rotation may be used on one or more propellers, as, for example, it is practical to employ an oil engine at 150 r.p.m. to assist a turbine at 3,000 r.p.m. In the past the sub-division of power units to meet conditions of varying load has not been seen in marine practice, it being necessary to have the whole of the power units in motion while the ship is being driven, however, slowly. The power units can be in the form of either steam engines, gas engines, or Diesel motors, and can be made of the most economical sizes, each unit being self-contained; furthermore, the number of propellers can be fixed with sole reference to the speed and type of ship, and all propellers can be in use at all powers.

As is well known, the oil, steam, or gas engine is most economical when run at its designed speed, for once it is throttled down, the fuel consumption per horse-power developed increases considerably, and here is claimed economy for the electrical transmission system. In cases where the ship is required to operate at widely differing speeds, the saving in the fuel bill resulting from the adjustment of the operating plant to the required power is calculated in favorable cases to be over 30 per cent. Another point about this installation is that non-reversible Diesel engines can be employed, as the prime movers are always running in the one direction. This prevents frequent handling of the Diesels, and accordingly reduces the air compressing plant.

The "Electric Arc."

The Tynemount, we may say, is not altogether an experimental vessel. This same system was tried in the spring of 1911 in the 50 ft. vessel, *Electric Arc*, built by Maclaren Bros., Dumbarton, for Mavor & Coulson, Glasgow, and proved quite successful.

In the *Electric Arc* the machinery consisted of a 40 b.h.p. oil engine driving an alternating current dynamo with its exciter, while on the propeller shaft was coupled an alternating current motor. Notwithstanding a loss of power of 10 to 15 per cent. between the prime mover and the propeller shaft, this little vessel showed herself good for a speed above what would have been attained had the oil engines been driving the propeller direct. The drawbacks to the electric transmission appear to be increased first cost, additional weight on board ship, and accordingly reduced deadweight carrying capacity, and a reduction in the cargo space owing to a somewhat larger machinery room.

The trials of the Tynemount will, in-

deed, be of considerable interest, as should the new system of propulsion fulfil expectations, there is every likelihood that it will be adopted for the big Canadian canal freighters of the future. The contract for the vessel came through John Reid Co., of Glasgow and Montreal, a firm who have in the past devoted much time to the development of the cargo carrier on the Great Lakes.

REID-NEWFOUNDLAND CO. R. M. S. "KYLE."

THE R. M. S. "Kyle" has been built and engined by Swan, Hunter & Wigham Richardson, Ltd., Neptune Works, Newcastle-on-Tyne, for the Reid-Newfoundland Co., of St. John's, Newfoundland, and is intended for their coastal service between St. John's,

upholstered with blue leather. It is divided from the entrance by a very effective screen of polished mahogany, filled in with stained glass. The entrance hall and staircase connect the smoking room, dining saloon and first class staterooms, etc., and are panelled with polished mahogany, whilst the floor is of indiarubber tiling. The first class staterooms are on the main deck below the dining saloon. They are 15 in number, with accommodation for 68 persons, one room being a ladies' room with 10 berths. These are all enamelled white, with mahogany furniture and upholstered with rose-colored moquette.

The second class passengers are berthed in the after part of the vessel. On the main deck there is a compartment for 102 men, and aft of this another for 39 women. Above on the up-



REID-NEWFOUNDLAND CO. R.M.S. "KYLE."

Newfoundland, and Cape Chudleigh, on the coast of Labrador, a service occupying a fortnight for the round trip, and often having to be carried on through ice. The steamer is finely modelled, 220 ft. in length by 32 ft. beam, and has passenger accommodation for 68 first class and for 141 second class.

Passenger Accommodation.

The first class passengers are berthed amidships. They have a fine promenade deck and in a house on that deck there is a comfortable smoking room, the walls being of oak, slightly fumed, with corresponding furniture upholstered in green leather. In the same house are the captain's room, the chief officer's room, and the wheelhouse. Below this, on the upper deck, are the ladies' room and the first class dining saloon. The ladies' room has walls of sycamore, satinwood furniture upholstered in old rose moquette, the whole effect being very pleasing. Aft of the ladies' room is the entrance to the first class dining saloon. This is an attractively decorated room, with walls and furniture of polished mahogany, the latter being

per deck, right aft, there are two hospitals, one for men, the other for women, together with rooms for doctors, baths, etc. The officers and engineers have rooms on the main deck at the sides of the engine casing, and the galley is placed on the upper deck forward of the engine casing, conveniently near the dining saloon.

Operating Equipment.

The steamer is fitted with an installation of wireless telegraphy, a complete installation of electric light, including a searchlight, and an efficient arrangement of steam heating suitable for the climate. The propelling machinery consists of a set of single screw triple expansion engines, having cylinders, 18½ in.-30½ in., and 50 in. diameter by 36 in. stroke, supplied with steam from two single-ended boilers, 13 ft. 9 in. diameter by 11 ft. 6 in. in length, fitted with six corrugated furnaces, and working under Howden's system of forced draught, at a pressure of 180 lbs. per square inch. The main condenser is one of Weir's latest "Uniflux" type. On the trial trip off the Tyne a speed of 13¾ knots per hour was attained.

Launch and Description of the Freighter "James Carruthers"

The Collingwood Shipbuilding Co. are to be congratulated on their achievement of construction of the Dominion's largest lake freighter, the culmination of which was the highly successful launch of the huge vessel on Thursday, May 23. To those who were present at the latter function, there was disclosed a revelation of Canadian shipbuilding capacity, both in yard facilities and individual fitness.

THE largest bulk freighter of her type yet built in the British Empire—the James Carruthers—was successfully launched by the Collingwood Shipbuilding Co., Collingwood, Ont., on Thursday, May 22. The new vessel which has been built to the order of the St. Lawrence & Chicago Steam Navigation Co., Ltd., Toronto, also bears the distinction of being the largest vessel of any description built in the Dominion. Mayor Gilpen, of Collingwood, proclaimed a half holiday for the occasion and several townspeople in addition to many hundreds from the surrounding districts witnessed the ceremony.

Mr. James Carruthers, the man whose name the new boat bears, and who, in addition to being a director of the St. Lawrence & Chicago Navigation Co., is a director of the Richelieu & Ontario Navigation Co., together with the leading officials of both the navigation and the shipbuilding companies, and a large number of the leading marine men of the Dominion were present.

Christening Ceremony.

The gigantic freighter was christened by Miss Lilian Wright, the ten-year-old daughter of Mr. A. A. Wright, one of the directors of the St. Lawrence & Chicago Navigation Co., and as a souvenir of the occasion she was made the recipient of a gold band wrist watch, together with a sheaf of American Beauty Roses, from the vessel builders.

Vessel Inspection.

An inspection of the vessel while on the ways, was made following the arrival of the noon train from Toronto, and, needless to say, there was nothing but commendation expressed concerning this latest product of the Collingwood Shipyard. Mr. James Smith, manager, was, of course, busy directing the preparations for getting the ship safely afloat, yet in spite of the weight of responsibility resting on him, he found time to answer questions and explain features of construction, accommodation, etc.

At 1.30 dinner was served in the Globe Hotel, and here, too, as aboard the "Carruthers," the satisfied appearance of each of the guests, spoke volumes for the ample provision made, and the accomplishments of "mine host" the proprietor of the Globe Hotel.

The launch took place at 4.30 in the afternoon, making the 38th vessel built by the company, and what is perhaps of more than passing interest, Captain Peter Campbell, of Collingwood, and a director of the shipyard, kept up his record of having been present at all of them.

Nearly Finished.

All the machinery has been installed in the vessel, and with the exception of the smokestack and a few minor fittings the boat was completed when launched. The finishing touches will now be rush-

ed, and the ship will be ready for service between the Georgian Bay ports and the upper lakes early in June. Upbound she will carry coal, obtaining this at Cleveland, and eastbound she will carry wheat or ore. She will sail under Captain W. H. Wright and Chief Engineer E. J. O'Dell.

Amongst Those Present.

A large party of officials of the company and their guests came up from Toronto in a special car and included the following: W. D. Matthews, president St. Lawrence & Chicago Steam Navigation Co.; James Carruthers, after whom the vessel is named; J. H. G. Hagarty, vice-president St. L. & C. S. N. Co.; Messrs. T. P. Phelan, A. Pepler, Gordon Osler, Robert Kerr, C. W. Band, A. W. Grassett, D. T. Simons, A. E. Matthews, John Carruthers, W. H. Holland, Capt. W. J. Bassett, John Carrick, D. O. Ellis, A. Hagarty of Toronto and Mr. Kittleman of New York; Thos. Britt, general fuel agent C.P.R.; P. Paton, Sarnia; D. S. Pratt, Midland; James Playfair, vice-president and general manager R. & O. Lines; A. A. Wright, director St. L. & C. S. N. Co., and Mrs. A. A. Wright, Peter Bain, M.E., Editor Marine Engineering of Canada, etc.

General Particulars.

The vessel is of the single deck type with topgallant forecastle, texas and



LAUNCH OF LAKE FREIGHTER "JAMES CARRUTHERS," AT COLLINGWOOD, MAY 22.

observation room on the forecastle deck with pilot house and bridge above. There is a large deck-house aft for crew accommodation.

The dimensions of the ship are as follows:—Length, over all, 550 feet 8 inches; length on keel, 529 feet; beam moulded, 58 feet; depth moulded, 31 feet. She will have a carrying capacity of over 10,000 gross tons on 19 feet draft, and has been designed to handle bulk cargoes of coal, ore and grain. The hull is built of steel on the arch and web frame system, leaving the holds unobstructed, by stanchions, a necessary feature where coal and ore cargoes are unloaded with clam shell buckets, which system is now universal on the Great Lakes. For the same reason, there are no deck-houses, spars or other obstructions on the weather deck for the length of cargo holds.

There are 31 cargo hatches, 38 feet wide by 9 feet fore and aft, spaced 12 feet centres, to facilitate loading and unloading operations, dispatch in port being a matter of the utmost importance where the season of navigation is so short.

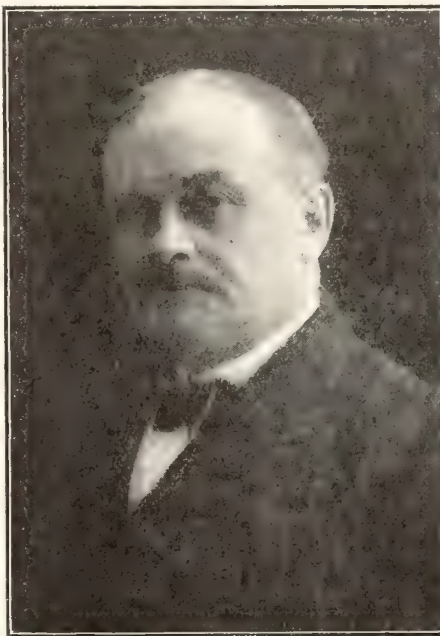
The arches and web frames are spaced 12 ft. centres, forming transverse girders, with channel bottom and side frames between, spaced 3 ft. centres. The vessel is constructed with complete double bottom 5 ft. deep and side tanks of same width to height of main deck stringer for water ballast, and forming a double skin over this portion of the ship to a point above the deep load line. The capacity of these tanks, including the peak tanks, engine room tanks and deep tank forward is approximately 6,600 tons.

The tank top on which the weight of cargo is carried, is supported by centre keelson and side girders of full depth of double bottom, carried continuously fore and aft, the tank top being of very substantial construction to withstand the heavy service where clam shell unloaders are used. There are two complete collision bulkheads, the space between these forming a deep tank. The cargo hold is divided by screen bulkheads into six compartments, and the double bottom by four watertight divisions into five compartments for water ballast. There is also fitted a cross bunker bulkhead between boiler and engine rooms and an after peak bulkhead. The spar deck stringer plating is supported by longitudinal channel girders, a new feature in a vessel framed on the transverse system, and one well calculated to give the stringers the support they require under the heavy stresses which lake vessels of this type, are subjected to. The scantlings of this vessel are, in many respects, in excess of those called for by the Great Lakes Register

of Shipping in which Society the vessel is classed "100 with star and crescent," having been built under inspection of Mr. Hugh Calderwood, of Barrie, acting for the Society and the owners of the vessel.

Handling Equipment.

The auxiliaries for handling and manoeuvring the ship are as follows. Steering gear—a 9 ft. by 9 in. quadrant geared steering engine, by the American Engineering Co., of Philadelphia, placed aft on main deck, direct connected by toothed quadrant to rudder stock and controlled from steering stands in the pilot house and on top of same by a hydraulic telemotor. In addition, there is an Aker's emergency steering gear, also a complete and independent steam gear, placed on the main deck, on port side, direct connected to a toothed quadrant on rudder stock and controlled



JAMES CARRUTHERS.

from a steering stand on top of the pilot house.

Steam is always turned on this gear, and should an accident occur to the regular gear, the Aker's gear may be engaged in three seconds by means of a crank on the steering stand controlled by the officer on the bridge which trips the regular gear and throws it out of service for the time being.

The windlass is of the Emerson-Walker quick-warping direct grip type, arranged to handle two Britannic stockless Bower anchors with $2\frac{1}{4}$ inch cables. The anchors are arranged to stow in pockets entirely within the hull. The balance of the deck machinery consists of four 8 in. by 10 in. single drum mooring winches, fore and aft on spar deck; one 8 in. by 10 in. single drum winch in windlass room, and one 8 in. by 10 in. double winch on spar deck aft,

arranged to handle $3\frac{1}{2}$ in. circumference mooring cables.

The second drum on the after winch is to take the kedge anchor warp, a $4\frac{1}{2}$ in. circumference wire cable, and by means of which the stern anchor, weighing 400 lbs. and placed on an inclined platform, may be instantly let go over the stern of the vessel, in case of accident. Two 5 in. by 5 in. single drum hatch winches are located amidships to handle the hatch covers. These are of steel and are opened and closed by a small steel cable led to these winches. All deck winches were supplied by the Chase Machine Co., of Cleveland.

Officers' Quarters.

The accommodation forward under the forecastle deck is conveniently arranged. On the port side are to be found five large and well ventilated rooms for first and second officers, wheelsman and watchman. The furnishings are of oak, and there are two clothes closets in each room. Adjoining is the crew's hall, wash and bath-rooms with improved sanitary fittings. On the starboard side are arranged the owners' staterooms.

Owing to the immense size of this vessel, these rooms are much more commodious than is usually found aboard ship. There are three sleeping chambers and bath, all fitted with linen and clothes closets. The panelled walls are beautifully tinted and decorated with gold, the ceilings are also panelled and painted in flat shadings. Each room is furnished with a solid brass bed around which is tastefully draped rich dark green velour hangings, giving each bed the four poster effect. The window hangings are made to correspond further. Each room is furnished with a ladies' princess toilet dresser of quaint design, and with gilt chairs, etc. The cabin floors, together with others are flush steel suitably decorated and supplied with deep pile rugs and runners to harmonize with other surroundings.

From the hall of these quarters there leads a solid oak stairway entering the deck above and into the lounging or observation room which is handsomely panelled in oak. There are ten large windows in this room, giving a splendid view on either side of the ship. The furniture is English willow of a rich Baronial brown tint and consists of chairs, rockers and couch with chintz cushions upholstered with best hair filling. A desk and dainty library table of same finish make a most delightful lounge. The floor is furnished with two beautiful seal brown Persian patterned rugs, and the window hangings are of rich poplin to match, caught back with silk cords.

Just aft of this observation room is situated the captain's office with heavy

oak roll top desk, rotary chains, etc., and a convenient lounge upholstered in leather. Connected with this room by an oak panelled hall is the bathroom and sleeping compartments of the captain. This is also of panelled solid oak with tinted panelled ceiling. The furniture consists of a handsome chifoniere couch, easy chairs, etc., upholstered in blue. The bed is of solid brass prettily draped with silk corded and blue velour curtains as are also the several windows. The floor is covered with deep pile carpet of blue to harmonize.

The after quarters are conveniently arranged to take care of the officers of that end of the ship. The chief engineer has a particularly large stateroom and bathroom. The walls are of solid oak panelled with tinted ceilings, while the oak desk, library chairs, couch, etc., together with the rich blue velour hangings of berth curtain and window curtains, go to make a most pleasant and comfortable room. The floor is covered with a fine rug to match other furnishings. Just aft of this is the hall and stairway to the engine room, the assistant engineer's room and that of the chief steward. Across on the port side, are to be found the cabins of assistant steward, and steward's bath and crew's rooms, all rooms being well ventilated. Aft of these is the crew's mess, and the galley, furnished with the most modern equipment.

Dining Rooms.

Opening from the pantry are two large, well-lighted and ventilated dining-rooms with trunk skylights, that on the port side having seating capacity for eleven officers. The table chairs, and handsome sideboard together with the panelled walls are of solid oak finished in a rich golden color. The floor is of inlaid linoleum. Alongside this dining-room, on the starboard side, is the dining saloon of the owners. This is furnished quite similar to that of the officers. The entire upholstery and furnishings, linens, cutlery, galley equipment, etc., of the ship was supplied by Mr. H. Trott.

Except where cement floors are used, as above mentioned, and for sanitary reasons, the steel decks have not been sheathed with wood, in the usual manner, but are covered with heavy removable rugs. Screens are provided for all doors and windows. The rooms are equipped with steam heating of ample capacity, hot and cold running water; the plumbing being of the highest quality. A telephone is installed in the captain's office for communication with the galley, for the convenience of guests and another located in the pilot house has connection with the engine room.

Navigating Equipment.

The navigating outfit is very complete and thoroughly up-to-date in every particular. It comprises repeating telegraph to engine room, with stands inside pilot house and on top, mates' telegraph for docking purposes with stands in the pilot house and aft on the spar deck, all with large dials; additional emergency signals; engine whistle pull inside and on top of pilot house and on each bridge; 2 sets of main signal whistle pulls, one for emergency use, with levers inside and on top of pilot house; a fog bell, a steering compass in pilot house and standard compasses in pinnacle on top of house, of Dobbie McInnes make, and a helm tell-tale, with indicator on top of pilot house and direct connected to rudder stock, showing true helm angle at all times, in case of derangement of the telemotor apparatus. There is also installed on top of the pilot house, a McNab engine indicator. This instrument is a splendid safeguard against the very costly accidents which occur frequently through a mistake in signals between bridge and engine room.

A Morrison trim gauge forms part of the equipment, as also a draft gauge, by which the mates can read the exact draft of the ship, in rough water, or at night, from an indicator and scale located on forecastle bulkhead forward and on deck-house, aft. A Thomson sounding machine is installed on the spar deck abaft forecastle bulkhead, with a crane on the bulkhead to handle the sounding device when overboard.

Deck Equipment.

The deck outfit is about as usual in large lake ships, there being two 20 ft. metallic lifeboats and an 18 ft. gasoline launch having a speed of about 8 miles per hour for use in harbor, all by Wm. Watts & Sons and equipped with Huff's releasing hooks, placed aft on cabin deck, under sliding davits. The fire and life-saving equipment, etc., all conform to Dominion Government inspection service.

There are two steel pole masts, one forward and one aft, to carry the running lights, while awnings are fitted over forecastle deck and pilot house.

There is installed a complete electrical installation, consisting of two 10 k. w. generators with a capacity of about 200 lights, being ample for accommodations, hold and deck lights and running lights. These are arranged on separate circuits, and an electric tell tale in pilot house gives indication of any derangement of the running lights.

Propelling Machinery.

The propelling machinery consists of one set of triple expansion engines with

cylinders 24, 40 and 66 in. dia. by 42 in. stroke, supplied with steam by three Scotch marine boilers 15 ft. in diameter and 11 ft. long, at 185 lbs. steam pressure. Howden's system of forced draft is installed. The indicated horsepower is 2,400 which gives the vessel a speed of 11 miles per hour loaded and 13 miles light.

The engines are located directly on the tank top, as far aft as possible, with the boilers forward of this located athwart-ships, three abreast, on heavy saddles. A cross coal bunker forward of the fire hold, has a capacity for about 300 tons.

The engines are handled from a working platform, below main deck level, of convenient height to suit the levers, with dynamo room abaft this. Great care has been taken in laying out the engine room to insure ample working space, while at the same time studying the comfort of the engineering crew.

The pumping equipment comprises one centrifugal and two duplex pumps located in the engine room to take care of water ballast; a sanitary pump and deck pump; one duplex main feed; one duplex auxiliary feed and fire pump on the upper engine room floor; air bilge and circulating pumps direct connected to engine; also hand bilge and fire pumps, forward and aft.

Refrigeration Equipment.

A refrigerating machine, by Kroeschell Bros., Chicago, having capacity of one ton in 24 hours is located in the upper engine room, and piped to refrigerator in the deck house above, this being fitted with cooling coils and also an ice door, opening on spar deck, for use should a supply of natural ice be at any time required.

Miscellaneous.

The hull of the vessel is painted black outside and grey inside, the interior of the double bottom and side tanks being coated with Briggs anti-fouling composition. The deck-houses are white, the spars yellow and the funnel black with red diamond, bearing the owners' mark.



MOTOR ENGINES FOR NEWFOUNDLAND FISHING BOATS.

DURING recent years, an increasing number of the people of Newfoundland have been installing motor engines which burn kerosene or gasoline in their fishing boats. They have been encouraged in doing so by the provision of the customs tariff which exempts from duty such engines as are to be used in fisheries, and by the liberal terms of purchase offered by some of the agents.

In the herring fisheries it has been noticed that in the last few years the

fish have shifted about much more than previously. This has been attributed by some to the presence of power boats, the claim being made that the herring are very sensitive to noises and are easily frightened by the vibratory noise of such boats. However true this conjecture may be (I do not think it has been proved correct), it has become almost impossible for the fishermen to follow the fish without auxiliary power. Besides migrating farther and oftener, the herring are found in smaller schools than formerly. This makes the placing of a number of fleets of nets in one place unprofitable, and increases the labor of the fishermen by requiring them to watch a number of scattered nets or fleets of nets. In the cod fishery of the west shore, which is the only other fishery in this neighborhood, power boats have proved useful.

Reliability a Requirement.

The demands upon an engine for such purposes are heavy. The herring season immediately precedes the winter, that is, it prevails in October, November, December, and if ice is slow in forming, in January. The weather during these months is probably the worst of the year. The bays are large enough to permit very rough seas, strong tides prevail, shelters are none too good and are distant from each other, and a fisherman's life is frequently dependent on the staunchness of his craft and the reliability of its motive power. For these reasons only heavy-duty engines are in demand and a motor engine incapable of standing the severest tests has a very short day of popularity.

Boat Models.

The problem of designing the larger boats has been overcome by the purchase and use of patterns from the United States. Such patterns have given excellent satisfaction, and are now used by many fishermen not only for the large but also for their smaller boats. Firms of St. Johns, Newfoundland, and Canadian firms are taking much interest in designing boats, particularly power boats, and in some cases, it is said, are now endeavoring to build up businesses in stock patterns such as have become popular. Ready-made frames are sometimes bought with the patterns. The increasing scarcity of lumber already mentioned has made orders for ready-sawn frames and for timbers and planking from the United States or Canada more frequent every year. It will be seen, therefore, that during recent years when the returns from herring fishing have decreased, the fishermen have had to buy or build larger boats and pay more for smaller ones.

An Appreciation of Newfoundland Fishermen.

P. T. McGrath, in writing of Newfoundland, says:—"These fishermen know their own boats as well as a jockey knows his horse. They build their fishing boats, rig and sail them and are excellent navigators. Children learn to sail boats at six or seven years of age. All skiffs are tested for their work before they are put into actual daily service, and if there is reason to fear that they might fail in an extremity, they are run ashore and left to rot, because there are times in the life of every fisherman when only the proved stability of his craft will save him from destruction."

Canadian-made dories have been bought by some of the fishermen because they are cheaper than those made in the United States. A Canadian single dory 10 feet long, costs about \$10; a double dory, 14 feet long, about \$16, as compared with \$15 and \$25 respectively for the same sizes of American dories. However, regardless of size, Canadian boats and ships do not give as good service, partly because the Canadian factories have not an equal quality of stock available. Only a comparative few of the Newfoundland fishermen can afford to buy ready-made boats, not to mention foreign built ones.

The Tariff Favors Fishermen.

Various tariff concessions are made for the benefit of the fishermen. Under a provision in the Newfoundland customs tariff, exempting from duty ships and other vessels to be continuously employed in the trade or fisheries of the colony, several New England schooners, built in the nineties, have been purchased and entered in the last few years for use in the west coast fisheries. A few new Canadian-built schooners have also been obtained for the same purpose, but, as I have indicated, old American vessels of this sort are favorably known and are cheaper and generally preferred.—U. S. Consular Reports.

NEW HYDROGRAPHIC STEAMER "ACADIA."

THE Hydrographic Service steamer "Acadia," built to the order of the Canadian Government, was launched from the Neptune Works of Swan, Hunter & Wigham Richardson, Limited, on May 8. The vessel is 170 feet in length by 33½ feet beam, and has been built to attain the highest class in Lloyd's Register. She will be propelled by a set of triple expansion engines, supplied with steam by two boilers working under Howden's forced draught. The vessel will be schooner rigged, and will

make 12 knots per hour. She is built of steel, is strengthened to enable her to run through ice, and will be completely outfitted for her intended service, inclusive of two motor launches, Lucas sounding machine, marine sentry, sounding winch, electric light, projector, etc. Besides the usual accommodation for the deck and engine-room officers, there will be well furnished rooms for the various officials engaged in survey work.

She has been constructed to the designs and under the superintendence of Mr. R. L. Newman, Canada, whose representative in England is Mr. F. L. Warren, of London. Both Mr. Newman and Mr. Warren were present at the launch.

As the vessel left the ways, she was named "Acadia," the christening ceremony being gracefully performed by Miss Hilda Thompson, daughter of Mr. R. Thompson, consulting engineer, of London.

FREIGHT THROUGH CANADIAN CANALS.

THE total quantity of freight which passed through the several Canadian Canals during the season of 1912 was as follows:—

	Farm Stock Tons	Forest Produce of Wood Tons		
Sault St. Marie	372	54,114		
Welland	678	227,684		
St. Lawrence	9,375	578,760		
Chambly	338	425,313		
St. Peter's	2,996	11,161		
Murray	37	706		
Ottawa	2,880	226,600		
Rideau	3,151	28,642		
Trent	361	67,489		
St. Andrew's .....	...	14,153		
	Manu- factures Tons	Products of Mines Tons	Agri- cultural Products Tons	Total Tons
	975,303	34,109,074	4,530,792	39,669,655
	625,569	797,072	1,205,912	2,851,915
	464,091	1,305,395	1,119,567	3,477,188
	11,600	161,458	19,706	618,415
	7,583	37,642	15,427	74,809
	101,511	67,379	448	170,081
	20,958	136,634	5,278	392,359
	18,814	105,531	3,995	160,133
	3,459	3,327	2,514	77,150
	60	81,299	37	95,549

The total quantity of freight moved on the Welland Canal was 2,851,915 tons, of which 1,205,912 tons were agricultural products.

On the St. Lawrence canals, the total quantity of freight moved was 3,477,188 tons, of which 1,119,567 were agricultural products, and 464,091 tons were manufactures.

On the Ottawa canals, the total quantity of freight moved was 392,350 tons; of this quantity 226,600 tons were the produce of the forest.

Kingston, Ont.—The tug Florence, of the Quebec Transportation Co., which ran ashore on Farran's Point, has been floated by the Donnelly Wrecking Co. of Kingston.

PACIFIC COAST

HYDRAULIC CAPSTAN FOR FISHING CRAFT.

IN view of the increasing employment of motor-driven hydraulic capstans, special interest attaches to a new model designed and built by the Torbinia Engineering Co for the British Columbian fishing industry, for which they have a number of engine sets and capstans on order. In the design of the new capstan, the main principle of hydraulic transmission of power, as adopted with the firm's ordinary capstan, is the same, but the rotating winding barrel is replaced by two exterior pulleys. It is hardly necessary to mention that both types are driven off the main propelling

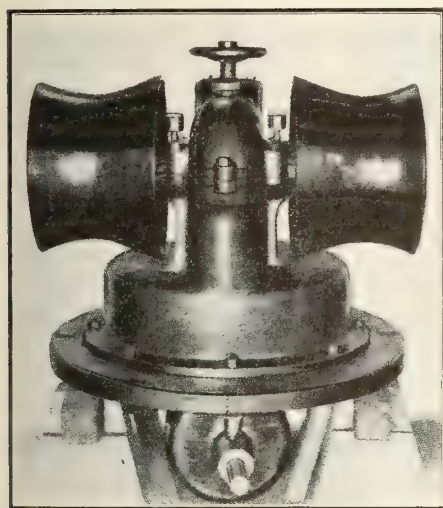


FIG. 1. TORBINIA HYDRAULIC CAPSTAN.

engine or by an auxiliary motor on deck, and so are adaptable for sailing, steam or motor craft. Briefly the operation action is as follows:

Operation Features.

The capstan is mounted on a heavy bed plate bolted to the deck, through which is carried the driving shaft and enclosed bevels from the engine. The driving shaft runs in ball bearings, and, when necessary, is fitted with universal joint couplings to compensate any slight alignment error when installing. The driving shaft rotates an enclosed drum fitted with a number of interior vanes, and contains a mixture of oil and water. Running within this drum is a

cage fitted with exterior feathering blades or vanes, which are controlled to any angle by a hand wheel. A shaft and worm gearing connects these blades to the winding pulleys. As the drum rotates, the liquid is carried round, and the centrifugal force throws it against the wall and pockets of the drum, and, impinging against the central blades, it hydraulically transmits the power.

At first it may be thought that the vanes are most efficient when set at right angles to the power. Curiously enough, however, the greatest efficiency is obtained when the central blades are feathered to a certain angle between right angles and edge-on to the liquid, due to the side thrust; yet when the blades are feathered until they are dead edgewise, no power is transmitted, and the liquid merely slips past. The advantage of this hydraulic arrangement is that any power or speed from zero to full engine power can be transmitted without jerking or strain on the engine.

Turning to Fig. 2, the construction can more easily be followed. (A) is the shaft from the engine, and this operates by means of the reduction bevel pinions (B), (C), and the shaft (Q), the latter being coupled to the rotating drum (D), its flange running on the ball bearings (P). As the drum (D) revolves, the liquid impinging in the pockets formed by the vane (R) transmits the force to the blades (F). The bosses of the latter are fitted with eccentrically-mounted pins at (G), which slide in slots in the flange (H). By turning the hand wheel (K), an inner shaft (J) lifts the flange (H), and thus feathers the blades. This inner shaft is bushed, and can revolve independently of the cage (T), which carries the blades.

Any axial thrust set up is taken by the ball-bearing (V), which is interposed between the hand wheel and the squared section of the shaft. A threaded extension (L), which works in a boss formed in the cover, is fitted to the hand wheel, and as the cover (U) remains stationary, a turn of the hand wheel will cause the inner shaft (J) to move up and down, as before mentioned, thus deflecting the blades. Normally, this shaft rotates with the blade cage,

and has the vertical motion when the hand wheel is manipulated.

When the cage (T) is turned by the force of the liquid action on the blades, it turns the outer shaft (S), which it will be seen runs between a pair of ball bearings, and has a worm gear (M) on its upper end. The latter meshes with a gear wheel (N) between, and is keyed on the same shaft as the two winding drums (O).

The same transmission has been adapted for the Torbinia winch. On the one bed-plate are arranged the driving motor and the winch, with the hydraulic gear interposed, the engine being arranged either vertically or horizontally. After passing through the

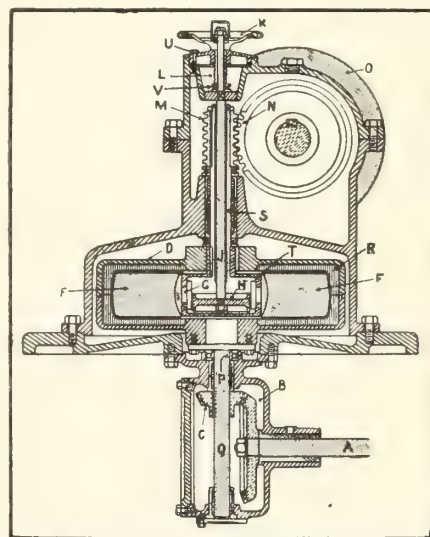
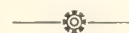


FIG. 2. TORBINIA HYDRAULIC CAPSTAN.

hydraulic transmission, the drive to the winding drum consists of duplicate worm and gearwheel operation, actuated by eccentric motions, while control is by frictionally locking or releasing the worm drives, in addition to feathering the blades in the drum.



Lightship Contract.—The Dominion Government has contracted with Bow, McLachlan & Co., Paisley, Scotland, for a screw steamer to be used as a lightship at Halifax. The price is said to be \$127,384.

BUOYS FOR THE PANAMA CANAL CHANNEL.

THE sides of the Panama Canal channel will be marked by gas buoys each consisting of a cylindrical floating steel body surmounted by a steel frame which supports a light and lens at a height of 15 feet above water level. The body is eight feet in diameter, made of 5-16 inch steel plate with dished heads, to the bottom of which is attached a steel tube and counterweight. The draught of the buoy will be twelve feet, and it will be moored on its station by a heavy chain and a concrete sinker.

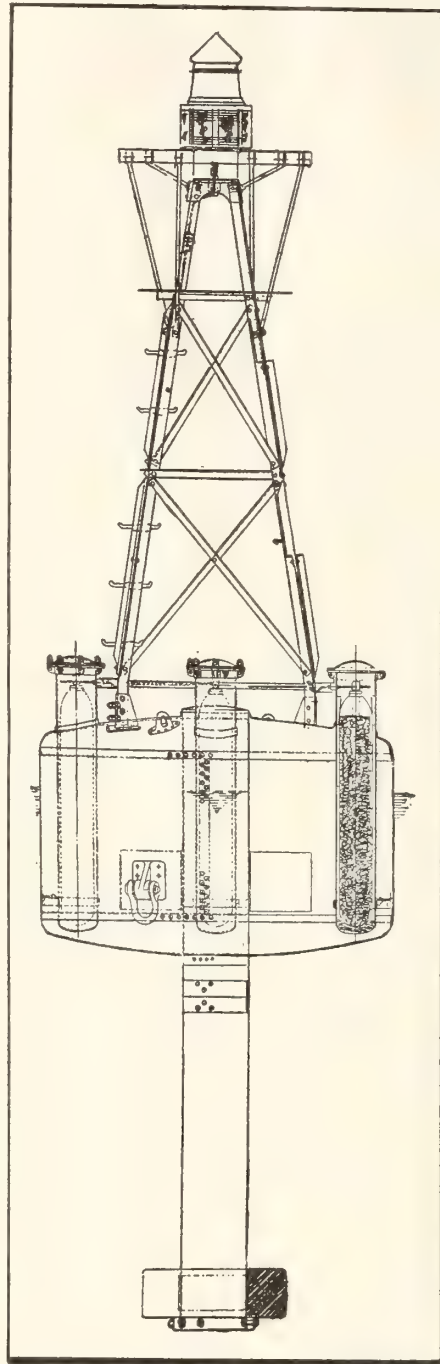
The corroding action of the salt water and sea air in the tropics is such that extra precautions must be taken to protect the buoys, and, therefore, the entire inside of the buoy is given first a coat of bitumastic solution, applied cold, and second, one coat of enamel applied hot. The exteriors of the buoys which will be moored in salt water will be given one coat of boiled linseed oil applied hot and two successive coats of the best quality of red lead, after which they will be treated with an antifouling compound.

The entire bed of what will be Gatun Lake, when the water is allowed to rise to an elevation of 87 feet, is covered with a dense tropical growth which in the state of decomposition causes the water to scour all ordinary paints from any kind of metal. To overcome this chemical action, the exterior of the buoys will first be painted with red lead and linseed oil, after which they will be painted with anti-corrosive paint.

The lens and lantern at the top of the steel superstructure contains the source of light which in all buoys is a small acetylene flame of about 40 candle power. The rays of light of this flame when projected through the lens produce a light of about 450 candle power. The acetylene gas for each buoy is stored under about 150 lbs. pressure in four tanks technically known as accumulators; each accumulator being inserted in a pocket in the body of the buoy, from which it may be withdrawn when empty and replaced by a fully charged accumulator without taking the buoy out of the water. The gas of the four accumulators is led through piping to a manifold, thence up one leg of the steel superstructure to a governor in the base of the lantern. This governor reduces the high pressure to the uniformly low pressure required at the burner.

Each accumulator is a steel cylinder nine inches diameter and 69 inches long, tested to 75 atmospheres and completely filled with a porous mass possessing a porosity of 80 per cent. Half of the porous space is occupied by acetone which is a peculiarly excellent solvent for acetylene. Acetylene dissolves as free-

ly in it as sugar does in water, and the solubility increases with the pressure applied. Acetone dissolves 25 times its own bulk of the gas at ordinary temperature and for each additional atmosphere of pressure to which it is subjected a similar quantity will be dis-



BUOYS FOR THE PANAMA CANAL. FOCAL PLANE 15 FEET ABOVE WATER LEVEL. EIGHT OF THESE BUOYS WILL BE PLACED IN THE ATLANTIC ENTRANCE, 6 IN THE PACIFIC ENTRANCE, AND 43 IN EASTERN LAKE.

solved. Compressing acetylene to more than two atmospheres at a temperature of 71 degrees F. makes it liable to explosion, but when the gas is forced into acetone, a mixture is secured which is free from danger of explosion, and therefore available for safe transportation and handling.

All the gas buoys will have flashing occulting lights, similar to those of the beacons for the Culebra Cut, and to obtain the flashes and occultations, the gas issuing from the governor at the base of the lantern passes into a small device known as the flasher through a valve which remains open during the whole dark interval. When a certain predetermined quantity of gas has passed into the flasher, so that a flexible leather diaphragm is at the top of its stroke, the inlet valve instantaneously closes, and simultaneously the outlet valve of the main burner opens, allowing the accumulated gas to pass to the main burner where it is ignited by a constantly burning pilot flame. The gas outlet remains open until the total gas quantity has been consumed in the main burner, whereupon the outlet closes and the inlet opens, remaining open until a similar quantity of gas accumulates in the flasher, when the cycle of operations is again repeated. Thus the light and dark intervals alternate automatically, and produce a flashing or occulting light.

The gas supply in each of the buoys will last from three to seven months depending upon the characteristic of the light, and will burn continuously day and night during that time. The acetylene gas will be made at the oxy-acetylene gas house at the Balboa Shops where it will be compressed and forced into the portable accumulators.



THE OLYMPIC-HAWKE DECISION.

THE long-delayed judgment of the Court of Appeal in the case arising out of the collision between the Hawke and the Olympic was delivered on April 5—about a year and a half after the casualty occurred. There had been a great conflict of evidence as to the exact place of the collision, but, roughly, it was agreed that it took place to the eastward of Egypt Point (where the Hawke had altered her course) and of the Bramble Buoy (to round which the Olympic had slowed), and to the west ward of the Ryde Middle. When it came to fixing the spot with exactitude it was found that the Olympic made the spot 220 yards to the N.N.E. of that given by the Hawke. Moreover, Capt. Smith, the late commander of the Olympic, thought the collision took place 260 yards to the N.W. of the place fixed by his ship's case; the pilot made it 420 yards to the N.W. instead of the 260 yards; and Col. Saxton White, a passenger, put it as 650 yards to the S.E. of the official spot. The three officers of the Hawke, on the other hand, agreed as to the place where the ship came to rest, and said it had been fixed

by the taking of two cross bearings, and had been logged.

The Admiralty Court judge accepted the Hawke's position as the true one. He was also of opinion that the Olympic's speed at the material times was higher than her witnesses admitted, and it was obvious from the conditions that it was an increasing speed, the vessel gathering way after slowing to round the buoys. The Hawke's speed, in the then condition of her bottom and with the horse-power developed, was adjudged to be about 15 knots at the material times. The speed of the two vessels was a vital point in this case, because so much turned upon the question as to whether the case was one of an overtaking ship. Then came the question of the courses of the two ships. The Hawke's course, after rounding Egypt Point, was given as S. 74 deg. E., the ship being put a little more to the southward because of the presence of the Olympic. That course was taken by the navigator in view of the appearance of the line of the West Conical, Chequer and East Conical buoys ahead of his vessel, he setting the course named to keep as close to them as he could in passing, adding that he, in fact, passed within 20 to 30 yards of each of them. This evidence was accepted by the president.

After rounding the Bramble Buoy, the Olympic's course was steadied on a course S. 59 E., the two vessels thus converging at an angle of 15 deg., but it was held that the line taken by the Olympic was much farther to the south than appeared from her case. It was alleged on behalf of the Olympic that, from the time she steadied on her course, the Hawke was the overtaking ship, but the examination of the evidence made by the president showed that to bear out the contentions submitted, the speed of the Hawke would either have had to have been beyond her possible maximum, or that of the Olympic must have been far below anything that was suggested. So it was held that, if anything, the Olympic was the overtaking ship—at all events, that the Hawke was not. Then came the decision that the collision was not due to any starboarding on the part of the Hawke, though she might have been carried towards the Olympic by a swerve which was beyond her control, but apart from the possible swerve she kept her course and speed. Finally, the Court was of opinion that the Olympic came too close to the Hawke, whilst her obligation was to avoid her, a thing which she had plenty of room to do. On this ground the Hawke was absolved, and the Olympic found alone to blame, though, being under compulsory pilotage, judgment was entered for her in the suit brought

against her by the Hawke. Of course, in the circumstances, her action against that ship's commander failed. This was in December, 1911.

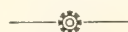
In February, 1912, dredging operations were undertaken in the Solent, and parts of the bow of the Hawke found in a position much nearer the position fixed by the Olympic's evidence than that given by the Hawke's and accepted by the Admiralty Court. Circumstances which we need not mention here postponed the hearing of the appeal for a year, but meanwhile an interesting discussion arose in the courts as to the admissibility of the new evidence; and it was only when determining the main questions that the Lords Justice decided that it should be admitted. Having regard to it, they were of opinion that it fell pretty much at the spot of the collision, which must, therefore, have occurred somewhat to the northward of the position indicated by the Hawke and accepted by the Court below. Even when that was conceded, however, it was impossible to consider her an overtaking vessel, the speeds being such that it would be impossible for the Hawke to have reached the place of collision in the time, if she had not been the leading vessel at the moment when the Olympic steadied on the S. 59 E. course. Thus, if either of the ships was an overtaking ship it must have been the Olympic, which, on this ground, had the duty of keeping clear laid upon her.

Lord Justice Kennedy expressed his decided opinion that the officers of the Hawke were mistaken in their statement that their ship had passed within 20 or 30 yards of the three buoys. She must have been more to the northward, or else she must have been more than 300 yards away from the Olympic when the swerve commenced. On this latter hypothesis, the suction theory was impossible. The Court of Appeal further held that the Olympic had failed to prove that there would have been no collision if the helm of the Hawke had never jammed. They believed that a very slight starboarding on the part of the Olympic at any time down almost to the last moment would have averted the collision, and she had room to execute such a manoeuvre, which they held she should have done under the rules, as she was, in spite of the ingenious argument put forward on her behalf to the effect that they were not crossing ships, within the meaning of Article 19.

Because their courses would involve risk of collision, Lord Justice Vaughan Williams held that a convergence to the extent of 15 deg., leading to eventual intersection being proved, he could not see any reason why the Court should find that the article did not operate under the circumstances. Nothing that the

Hawke did or omitted to do was held to have in any way contributed to the casualty. The Court of Appeal even said that an alteration by the Hawke in her course or speed might have misled those in charge of the Olympic, and there was no obligation on her to give way. On this point there was an argument by Mr. Laing, who sought to implicate the Hawke for not giving way by extending the principle of the *Pekin* case—which arose out of a collision in a winding river—so as to extend the duty to the case of such a ship as the Hawke, which was, on the occasion before the court, navigating a curved channel limited by buoys.

Lord Justice Vaughan Williams, however, held that that decision could not be prayed in aid of the Olympic on this occasion. The fact of the matter seems to be that, as Sir Samuel Evans remarked, the case between the Olympic and the Hawke is largely a dispute as to the facts. The courses of the two ships and the times of their passing certain points have been found as facts by the court of first instance; the speeds of the two vessels are also approximately fixed, by their capabilities on the one hand and the admitted facts on the other, and, that being so, the case of the Olympic fell to the ground. For the same reason the Hawke was not considered an overtaking ship, so she was fixed with no duty to avoid the other ship on that head. It has been found as a fact that she did not starboard into the Olympic, and the converging courses and the position of the Olympic before the collision lay upon that vessel the obligations of the crossing rule.—Syren and Shipping.



STEEL SHIPBUILDING IN NOVA SCOTIA.

THE special agent of the British manufacturers has recommended the building of a steel ship plant and traction engine works at Sydney, Nova Scotia. The shipbuilding scheme involves an expenditure of about \$5,000,000, and provides a plant capable of building steel ships of any size up to 7,000 tons for the freight and coasting service. The smaller craft will include tugs, tenders, and other ships of such size and class. The product of the traction engine works will include all classes and types.

In connection with the shipbuilding plant and the traction works, it is pointed out that Sydney is exceptional in its advantages for this class of industry. Rail and water connection, steel producing mills, and the close proximity of coal, make it a very desirable location for any iron or steel manufacturing concern.

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CANADA'S MERCHANT AND NAVAL MARINE.

IT is abundantly evident from a perusal of the editorial pages of this issue of Marine Engineering of Canada, that Canada's merchant and naval marine, if we may use the latter term, is growing and developing in size and number of vessels at a rate undreamt of a few years ago, and we can take a pardonable pride in the achievement of our premier shipyard at Collingwood, Ont., as exemplified in the successful launch of the big lake freighter, "James Carruthers," even although the vessel's size and appointments do not approach to the

masterpieces of naval architecture and marine engineering produced in Great Britain and Germany.

A growing disposition is becoming apparent, particularly with reference to vessels required for Government purposes, to have these either built by already established shipyards within our borders, or make it necessary for British builders who contract for them, to establish plants for the purpose at a number of our leading ports. There has been much loose talk regarding the coming of leading British shipbuilders to our shores, but, so far, little has materialized in this direction, and it does not seem likely that much progress will be noted until steps are taken to insist on our ships being built on Canadian soil, and by resident Canadian artisans.

The shipbuilding and marine engineering industry needs fostering by our Federal Government, and a little more intimacy with what is now being accomplished by the existing concerns, on the part of the responsible Departments at Ottawa, is all that is necessary to secure increased support to what should be one of our important national industries.

SHIPBUILDING AT MONTREAL.

THE Canadian Vickers Company have decided to go ahead with their Montreal plant at once. Located in Maisonneuve, their work will make the place alive with activity. They will begin almost immediately with the construction of their administrative offices and the establishment of a shipbuilding and repairing plant, according to a statement made by one of their officials recently. One big building has already been completed and equipped with machinery, and it is understood that several hundred thousand dollars will be spent on work to be undertaken. The company has made application to the Montreal City authorities, regarding the line of road on Notre Dame St. East, upon which their new offices will face.

The main works have been planned so that they will in no way interfere with the extension of the city streets down to the water front, and the general scheme involves machine shops, boiler and engine shops, storehouses, ship ways and a score or more of big structures necessary to the carrying out of their various enterprises. All the ground in the neighborhood of the floating dry dock has been cleared and leveled, and a member of the Vickers' organization states that they are only waiting now for the plans to reach them from England in order to proceed with construction.

The shipbuilding slip will be started this summer, and while it is explained that the actual ship building plant will not be completed this year, every facility will be afforded and provision made for the repairing of vessels during the present season of navigation. The Harbor Commission are obliged to co-operate with the dry dock people by providing permanent improvement of their rail connection with the works, in addition to dredging the basin in which vessels will in future be launched.

From the foregoing it will be noted that despite the political feature, which is, of course, more or less relative to warship building, there is every evidence that the development of the shipbuilding and marine engineering industry towards the front rank of the manufacturing enterprises of Canada bids fair to make rapid progress. As has been pointed out in these columns on previous occasions, there is both need and opportunity for the higher and larger achievement that the shipbuilding industry will bring; we, therefore, express the hope that the near future will witness a like display of confidence in our country by others, as that exemplified by Vickers, Ltd.

MARINE NEWS FROM EVERY SOURCE

Montreal, Que.—The Canadian Pacific Railway Co. will build two new Atlantic liners of about the size of the *Alsatian* of the Allan Line.

Sarnia, Ont.—The steamer *Midland Prince* arrived on May 23 with the first cargo of iron ore for the Hamilton Iron and Steel Co. of Point Edward.

Collingwood, Ont.—This town will be included in the route of the steamer "North American" during July and August, which is the excursion season.

Brantford, Ont.—It is announced that in the supplementary Federal estimates there will be a preliminary grant of \$75,000 towards the improvement of Port Dover Harbor.

Sarnia, Ont.—The steamer *Ionie*, of the Northern Navigation Line, will be taken to Midland by the tug *Premier*, and later to Collingwood, where new boilers will be installed.

Fort William, Ont.—The City Council will make improvements to the subway leading to the city dock, and will erect a shelter, ticket office and baggage room for the accommodation of passengers.

Parry Sound, Ont.—A new tug has been built for the Conger Lumber Co. at the Thompson boat works. The tug, which is 40 feet long with a beam of 10 feet, will be used chiefly for harbor work.

Port Stanley, Ont.—The London Board of Trade recently passed a resolution agreeing to assist the *Richelieu* and Ontario Navigation Co. to make a port of call for their own boats at Port Stanley.

Kingston, Ont.—The steamer *Simla* with the barge *Burmah* in tow ran ashore on Simmons Reef recently. The vessels were loaded with square timber, and were bound from the Georgian Bay to Kingston.

Montreal, Que.—Shipowners declare that the \$2,000,000 floating drydock placed here last year is likely to prove a failure, as no company will put a ship in the dock while there is a chance of sending it to British ports for repairs.

Toronto, Ont.—The Polson Iron Works Co. has given orders to Eng-

berg's Electric and Mechanical Works, St. Joseph, Mich., for two generating sets, searchlights, etc., to be used in connection with Dominion Government contracts.

Port Arthur, Ont.—The Great Lakes Dredging Co. of Port Arthur has issued a writ against the Polson Iron Works Co., Toronto, claiming \$47,513 damages for alleged breach of guarantee respecting certain boilers purchased from the defendants.

Lachine, Que.—Two days earlier than any previous record, the Lachine Canal opened for the season on April 23. Between nine and ten o'clock—the first hour after it was ready for business—six vessels of different descriptions locked into it from the Allan basin.

Sault Ste. Marie, Ont.—The Canadian freighter *Turret Crown*, bound down, was in collision with the *William H. Mack*, also bound down, near Whitefish Point, during a dense fog Friday, May 21, and got so badly damaged that she was beached to prevent her from foundering.

Kingston, Ont.—The schooner *Major Ferry*, owned by James Sowards & Co., coal merchants, of Kingston, struck the railway bridge in the Murray Canal on Saturday, May 10, and was sunk. The schooner was light. The owner is making arrangements to have the vessel raised as soon as possible.

Windsor, Ont.—Being a menace to navigation, it is likely that dynamite will be used to remove the tow barge *Iron City*, struck and sunk by the Steel Trust steamer *Thomas F. Cole* recently off the head of Hasen's Island, St. Clair River. Nothing but the spars of the vessel are showing.

The Hepburn Line it is reported to have gone into the hands of a new company, headed by Aemilius Jarvis, of Toronto, Alfred Goodearle, formerly of Kingston, is manager. Mr. Goodearle was for years connected with the Folger Company, after which he was employed in the Toronto and Hamilton line.

Point Edward, Ont.—The Dominion Government wireless station on the lake shore at Point Edward, which has been in course of construction for sev-

eral months past, has been opened for business. The station is controlled by the Marconi Wireless Telegraph Co. of Canada, with head offices at Montreal.

Collingwood, Ont.—The Dominion Department of Public Works are advertising for tenders for dredging in this harbor. These will be received up to four o'clock on Thursday afternoon, June 5th. The specifications require that the contractors must be ready to take up the work within thirty days of the acceptance of their tender.

Port Arthur, Ont.—The new ice-breaking tug, *J. D. Horne*, was launched at the western drydock on May 10th. The christening ceremony was performed by Miss Muriel Jackson. The new craft is 125 ft. long, 28 ft. beam and 16 ft. deep. She is fitted with triple expansion engines, and is the property of the Great Lakes Dredging Co.

Toronto, Ont.—The proposal of the Navy Department of the Dominion Government to make it compulsory for excursion and freight steamers on the lakes to be equipped with a wireless apparatus in connection with the several stations to be erected by the Government, is not meeting with the approval of the Canadian steamboat interests.

Kingston, Ont.—Navigation on the Erie Canal between Lake Erie and Hudson River will be opened June 1st. It is expected many eastbound boats will be clearing from Buffalo as early as May 26th to be in readiness. The delay in opening the canal is due to the failure to complete the junction lock at Vischer's Ferry. The canal is usually open by May 15.

Fort William, Ont.—Work involving large expenditures will be carried on in Fort William in 1913. Water front development, costing \$20,000,000, will include besides the construction of additional slips, dredging, building of breakwaters, the provision of additional elevator capacity, additional freight and coal sheds for the Canadian Pacific and Grand Trunk Railways.

Port Colborne, Ont.—The steamer *Seguin*, downbound, loaded, and the steamer *Masaba*, upbound, light, were

in collision in the Welland Canal, near here, May 13, and both boats were seriously damaged. The Masaba has a large hole in her bow, penetrating the forward compartment, and repairs to four plates will be required. The upper works of the Seguin were badly cut up.

Toronto, Ont.—Another long-felt need of the Toronto Harbor has been remedied by the Harbor Commission in the establishment of a municipal dock for tramp vessels only. A dock at the foot of Yonge Street has been taken over for this purpose, and the location is a very convenient one. The Arabian, from Wallaceburg, with 500 tons of sugar, was the first boat to make use of the dock.

Sarnia, Ont.—The Port Huron & Sarnia Ferry Co. has sent word to the Postmaster that it will terminate its contract for the carrying of local mail to the Canadian city as soon as possible. The Government demands that the mail be carried twice each day the year round. Because of its rush of business the Ferry Co. now declares that it has no time to bother with the mail, and seeks to give up the contract.

Sarnia, Ont.—The tow barge Iron City, struck and sunk by the Steel Trust steamer Thomas F. Cole, off the head of Harsen's Island, St. Clair River, will probably be dynamited by the United States Government, as in her present position, with nothing but her spars showing, she is a serious menace to navigation. The Iron City extends into two-thirds of the width of the channel, and is diagonal to the shore line of the island.

Amherstburg, Ont.—The continuous ringing of the automatic fog bells placed this year on the Limekiln Crossing lightships was so disturbing to residents of Amherstburg that they rose in angry rebellion and declared the bells a nuisance. This is the first season for the new signals, they being placed on the lightships by the Canadian Government to eliminate the necessity of ringing them by hand.

Instead of being connected only when there was fog, the bells rang whether the weather was foggy or not. So strenuous were the complaints that the Department of Marine and Fisheries has decided to remove the noise-makers. At night, according to complaints registered, the bells could be heard from one end of the town to the other, and sounded like the tolling of several large church bells.

Cleveland, Ohio.—Orders have been issued for changes in the names of thirteen of the seventeen Gilchrist steamers. The changes are as follows:—

S. B. Woods to Artus; L. Woodruff to Argus; G. H. Russell to Canopus; F. W. Gilchrist to Cepheus; H. S. Sill to Cetus; J. L. Weeks to Corvus; J. C. Gilchrist to Cygnus; R. E. Schuck to Hydrus; F. J. Hecker to Perseus; R. L. Ireland to Cyrus; P. G. Walker to Taurus; Lake Shore to Indus; Gilchrist to Lupus.

Sarnia, Ont.—The old car ferry, Ste. Marie, which formerly plied between Mackinac and St. Ignace, passed up the river on May 15 in tow of the tug Sarnia City. The big boat will be taken to Port Arthur, where she will be stripped of her enormous upper works, and will be converted into a lighter for one of the wrecking companies. The boat went south to Cleveland last year, and was stripped of her boilers and engines at that time. Whalen Bros. is the firm that will own her.

Toronto, Ont.—With a view to relieving the congestion at the Yonge Street docks, the Richelieu and Ontario Lines will utilize the lower end of pier No. 1, the freight dock of the Inland Lines this season, as the terminal for the steamers running on the Toronto-Hamilton route. The company have also dispensed with the system of collecting tickets as the passengers pass over the gang planks to the steamers plying between Toronto and all points on the north and south shores.

Montreal, Que.—Collision with an iceberg in a dense fog was the experience of the Chiltern Range of the Furness Line, while on her voyage from Hull to Montreal. Her bowplates were badly dented by the glancing blow she struck the berg, and standing away to the eastward after the collision, the steamer was surrounded by icebergs that could be heard, though not seen. The escape of the vessel from more serious injury seems to have been nothing short of miraculous.

Londonderry, Ireland.—The first launch by the new firm—the North of Ireland Shipbuilding Co.—took place on 19th April, the vessel put in the water being one 250 ft. long, built for the Canadian Lakes service. The new steamer, which has been constructed on the Ayre-Ballard system, will have propelling machinery supplied by Richardsons, Westgarth & Co., Middlesbrough, England. The next vessel to be launched will be one of similar dimensions for the same service, while a steamer of much greater size—8,000 gross tonnage—is also under construction.

Collingwood, Ont.—The James Caruthers, a big freighter on the stocks here, will be launched in about two weeks.

Ottawa, Ont.—The total number of vessels on the register books of the Dominion, according to a report just issued by the Department of Marine and Fisheries, for the year ending December 31 last, was 8,380, measuring 836,278 tons, being an increase of 292 vessels and 65,832 tons, as compared with 1911. The number of steamers was 3,667, with a gross tonnage of 641,225. The value of vessels of all kinds is placed at 825,083,340. It is estimated that 42,485 men and boys, inclusive of masters, were employed on ships registered in Canada during the year 1912.

Niagara Falls, Ont.—The passenger steamer Frontier, in accordance with a commission of appraisement by the Exchequer Court of Canada, Toronto Admiralty District, was sold at auction in April for \$7,000. A number of bids were made, but the above price was a very low one for a boat of such size. Her length is 186 feet and her beam 26 feet, while her height from the bottom of the hold to the top of the second deck is 23 feet. Moreover, the sale price included her tackle, apparel and furniture. The identity of the purchaser was not disclosed, and the use to which the boat will be put is apparently not yet decided.

Sarnia, Ont.—The big steel freighter Howard M. Hanna, Jun., owned by the Richardson Transportation Line of Cleveland, met with a bad accident near the mouth of the river on April 1. The boat, which is one of the largest on the lakes, was loaded with ten thousand tons of coal. The current at this point is very swift, and under the heavy strain, a ring in the steering apparatus broke, with the result that the boat headed straight for the Canadian shore, and did not stop until she had pushed her nose far into the dock of the Dominion Steel Co. The damage to the dock will amount to about a thousand dollars, while the damage to the boat was also considerable.

Welland, Ont.—The first accident on the Welland Canal for this season occurred about six o'clock on April 29, when the steamer A. E. Ames, bound down from Port Arthur to Montreal with flaxseed, struck and carried away one of the gates at Lock 5. The gates were being opened to let the steamer through, when a fuse in the electrical machinery which is used to open the gates blew out, and the gate came to a sudden stop. The Ames was going slowly at the time, but before she could be stopped had struck and dislodged the gate. Repairs were at once started, and locking was resumed about three o'clock in the afternoon.

TO ENCOURAGE SHIPBUILDING IN CANADA.

DURING a recent afternoon sitting of the House of Commons at Ottawa, an interesting discussion arose over the item of one million dollars for maintenance and repairs to Government steamers and ice breakers. Hon. Mr. Lemieux asked if the ships to be procured would be built in Canada.

The Hon. Mr. Hazen stated that experience had shown that contracts let in Canada had not been delivered on time, whereas when contracts were let to firms of established reputation in Britain, such conditions did not occur. Tenders from the other side of the water were much lower. It would, however, be quite fair, said the Minister, to ask that tenders awarded to British firms should be carried out in Canada, and that firms should establish yards in Canada where the ships would be built.

Ice-breakers to be Built Here.

Referring to ice breaking on the St. Lawrence, the Minister of Marine spoke of the effective work carried out by the Montcalm and Lady Grey. In the vote before the House, he said, the Marine Department was asking for \$250,000 to procure a modern and powerful ice-breaker for the St. Lawrence River. This was most necessary in order to open navigation to Montreal earlier in the spring.

The Hon. Mr. Lemieux asked if this boat would be built in Canada, and Mr. Hazen replied that he believed such was the intention.

Mr. Lemieux was glad to hear of this addition to the flotilla of ice-breakers. At first there had been a prejudice against these boats at Quebec on account of the work done at Cap La Roche, but good results had followed in the prevention of floods as far as Three Rivers and Lake St. Peter. The member for Rouville again touched on the question of shipbuilding in Canada, and asked the Minister to give it encouragement even if, at first, prices were somewhat higher. He referred to Vickers, Limited, at Montreal, and expressed his belief that Maisonneuve would yet become a great shipbuilding area.

SHIPPING AGREEMENT.

REFERRING to the Atlantic rate war which had been in progress between the Canadian Pacific Railways and the companies constituting the Atlantic "pool," the Standard announces that, as result of Sir Thos. Shaughnessy's visit to London, a provisional agreement has been arrived at in regard to emigrant business from Trieste.

"The terms of the arrangement have not yet been made public," it says, "but we believe we are correct in stat-

ing that the Canadian Pacific Railway Co. and the Austro-American Line, which represents the Atlantic "pool," will in future despatch alternate boats from Trieste, while the profits derived from this source are to be placed in the pool, which, in its turn, will divide its surplus balances with the C. P. R."

LIVINGSTONE CHANNEL NAVIGATION.

VESSEL masters who navigate the Livingstone Channel are complaining that most of their difficulty in entering the new cut is in making the sharp turn required just before the channel is reached. This becomes necessary by a projection of rock-bottom, averaging 15 feet in depth, which must be passed in making the swing from the main channel. One captain says he found that the turn just above Livingstone Channel is much more to be reckoned with than are the dangerous cross-currents after leaving the cut. Boats operating down the new channel find that by steaming ahead at a fairly good speed and hugging the west bank, the passage can be made with ease. It requires skilful navigating, however, to pass the shallow projection off the entrance.

TORONTO HARBOR IMPROVEMENT TENDERS.

THE Dominion Government is asking tenders on its share of the Toronto Harbor Development Scheme, which is estimated to cost \$6,123,284. The whole work will not be divided up into a series of contracts, but the contractors who submit estimates must be prepared to take on the whole work, which must be commenced this summer.

Government's Share.

The work allotted to the Dominion Government is the construction of the ship channel and harbor extension in the industrial district; the necessary shore protection at the east end of the inner harbor; the construction of the breakwater from eastern harbor entrance to the eastern city limit, and the construction of the western breakwater from the harbor entrance to the Humber River. The Government has also undertaken the construction of the swing bridges across the eastern and western gaps. At present Toronto Harbor Engineer Cousins is busily engaged designing these, and when they are completed, the authorities will ask for estimates on their construction.

Dredging to Commence.

Work will also commence this season on the extensive dredging operations. The date for opening the tenders for

this work is set for May 28, and much competition is anticipated. The sand will be used for reclamation purposes all across the entire front of the city, including the filling in of 1,000 acres in the industrial district and the creation of 894 acres of new park lands. The work is estimated to cost \$5,000,000.

The Public Wharf.

The public wharf operated by the Harbor Commission is already proving a boon to shipping; and Secretary Alex. Lewis declares that it has already justified itself. Two vessels have arrived at the harbor and could not find suitable wharfage facilities at the docks controlled by private companies, but an application to the Harbor Commission soon procured room for their cargoes on the public dock. The commission is charging a reasonable rate. Much business will be transacted at this wharf during the season.

TWO-CENT GRAIN RATE.

THE grain rate from Duluth-Superior harbor to Buffalo was settled at two cents on May 23, and the indication is that boats now on the market for early loading will have to accept this figure. The demand for tonnage is not active, and ore men are well loaded up ahead. The ore is going forward in good style. A Cleveland steamer which was sent for contract ore was chartered recently for wheat, from Fort William to Buffalo, at two cents, with a despatch guarantee.

To prevent a loss from spoiling of small grain stored in elevators and warehouses, the total of which runs annually into the millions, the Minnesota State Board of Grain Appeals has decided to make practical tests to ascertain in what percentages of moisture grain may carry and still be safe for warehousing.

ECHO OF "ROYAL GEORGE" STRANDING.

CAPTAIN HARRISON, whose certificate was suspended after the Royal George stranded in the St. Lawrence River last fall, was heartily congratulated by the Mercantile Marine Service Association on having had his certificate returned.

Captain Harrison said that the English Board of Trade had shown they were ready to see the injustice by Colonial Courts rectified. He thought he could claim the command of the Royal George again, and have his salary and expenses. He was still without employment through the Canadian Government's action. The certificate was suspended by the Dominion Wreck Commissioner, who inquired into the accident.

CHANGES IN AIDS TO NAVIGATION.

SEVERAL changes in aids to navigation which have been made recently, or are to be made in the near future, were recently announced by the United States Bureau of Lighthouses. The intensity, illuminant and characteristics of the light at Thunder Bay Island light station will be changed about May 20th, when the intensity will be increased from 5,000 to 50,000 candle power by the installation of incandescent oil vapor as illuminant. The characteristic will be changed to show a flash of 4 seconds alternating with an eclipse of 26 seconds.

About June 5th the light station on south shore of Lake Superior, will be increased from 18,000 to about 410,000 candle power. The characteristic will be changed to show a flash of 4.7 seconds, alternating with eclipse of 40.3 seconds. Superior entry south breakwater light station will be established about June 1st at Superior Bay entrance. A light will be shown 70 ft. above water, and will be an occulting white of 4,500 candle power, showing illumination of three seconds alternating with eclipse of five seconds.

The color of St. Clair Flats Canal lower lighthouse has been changed from red to white, increasing its intensity from 130 to 520 candle power.

BETHLEHEM PURCHASE OF FORE RIVER SHIPYARD.

ANNOUNCEMENT is made of the purchase of the Fore River Shipbuilding Co., Quincy, Mass., by the Bethlehem Steel Corporation, putting the latter in the position of being able to compete in the construction of warships as well as the other types of vessels it now builds. The yard at Quincy will, therefore, furnish an outlet for a certain amount of the Bethlehem Steel Co.'s output of armor plate, structural shapes, forgings, ordnance, etc.

The terms of the purchase are indicated in a letter sent by the directors' and a stockholders' committee to the holders of Fore River Co. shares. It says that the Bethlehem Steel Corporation takes the plant and other assets of the shipbuilding company, including good will, and assumes its contracts and liabilities. In return, the Bethlehem company "pays \$600,000 in fire lien and refunding 5 per cent. mortgage bonds due in 1942, of the Bethlehem Steel Co. The committee is to purchase and arrange the sale of \$750,000 of first mortgage 20-year 5 per cent. bonds, a lien on the present property, as issued by a new Massachusetts corporation, said bonds being guaranteed principal and interest by the Bethlehem Steel Co.

The Fore River Shipbuilding Co. has outstanding \$2,400,000 of preferred and the same amount of common stock. It has no bonded debt, and is reported to have kept free of bank loans. The outlook for dividends, as is well known, is remote and the stockholders have, therefore, been willing to sell at considerably below par. It is stated that Admiral Bowles will remain in charge of the property. A new dry dock is reported to be projected.



THE CUNARD LINER "AQUITANIA."

THE accompanying details of the Cunard Liner Aquitania, recently launched on the Clyde, may be accepted as indicating the many outstanding features of this latest triumph of naval architecture and marine engineering. For the data, we are indebted to "Syren and Shipbuilding," London.

Constructional Features.

The Aquitania has been launched, and the world at last knows the precise dimensions of the giant Cunarder. Those, given out officially, are as follows: length, 901 ft.; breadth, 97 ft.; depth to boat deck, 92 ft. 6 in.; with a gross tonnage of 47,000 tons. There will be accommodation for 3,250 passengers, while the crew will number nearly 1,000.

In the printed description issued by the Cunard Company there is no mention of any new feature as regards the passenger accommodation. The vessel will have verandah cafes, an a la carte restaurant and grill room, a gymnasium, and a swimming bath, but these, of course, are institutions which no self-respecting Atlantic liner can afford to be without nowadays. The details as to the sub-division, too, convey nothing in the way of news, for it has been known for some considerable time past that the Aquitania was to have an inner skin. The space between the inner and outer skins averages about 15 ft., and at short intervals there are cross bulkheads which divide it up into small compartments. Thus, while we dare not say that the vessel is unsinkable, she is so near to it as to render the possibility of a catastrophe practically a negligible quantity. In addition to the safeguards already mentioned, she has 16 cross bulkheads extending from side to side, while the system of watertight decks adopted in the Lusitania and the Mauritania has been further developed in the case of their younger, but bigger, sister. With regard to boat accommodation, it is stated that the Cunard Company, 15 months ago, submitted plans to the Board of Trade for an installation of lifeboats to accommodate every passenger on board,

and that two motor lifeboats will also be provided.

A Meritorious Achievement.

To congratulate the Cunard Company and John Brown & Co., the builders, on the magnificent ship which the enterprise of the one undertaking and the resources of the other have conjointly brought into being, would be a work of supererogation. There are some works which are above commendation, and the Aquitania is to be numbered amongst them.

Her turbines arranged in three engine-rooms, will work on the triple compound system. The port wing-shaft will be rotated by a high-pressure turbine exhausting into an intermediate pressure turbine on the starboard wing-shaft, whence the steam will pass to the low-pressure turbines on the inner shafts. In the event of an accident, it will be possible to cut out the high-pressure turbine, the steam then passing direct from the boilers to the intermediate-pressure turbine. Should it become necessary to cut out the intermediate-pressure turbine, the steam would pass from the boilers to the high-pressure turbine on the port wing-shaft, and thence to the low-pressure turbine on the port inner shaft, while the starboard low-pressure turbine would be driven by boiler steam passing direct through the lead provided for the running of the low-pressure turbines when manoeuvring. In the event of the low-pressure turbine on the starboard inner shaft being put out of action, the high-pressure, intermediate-pressure and port low-pressure turbines could be operated, a blank flange being fitted in the connection between the intermediate-pressure turbine and the starboard, low-pressure turbine. There will be twenty-one double-ended boilers, each with eight furnaces, working at a pressure of 195 lbs. They will be arranged in four boiler-rooms, with cross-bunkers at the forward end of No. 1, and between Nos. 1 and 2 and Nos. 2 and 3.

The launching ceremony was a brilliant function, amongst those present being: Lord Aberconway, chairman of Messrs. John Brown & Co., Ltd.; the Earl and Countess of Derby; Mr. Sydney Buxton; Lord and Lady Inverclyde; the Earl of Stair; the Duke of Richmond and Gordon; Baron Von Horst; Sir Thomas Mason; Lord Provost Stevenson; Vice-Admiral Bearcroft; and Mr. A. A. Booth. The vessel was released by the Countess of Derby, and only 91 2-5 seconds elapsed before the great structure was completely water-borne.

Proposing the toast of "Success to the Aquitania and the Cunard Company" at the subsequent luncheon, Lord Aberconway said that although the new

of the *Lusitania*, she was undoubtedly the most remarkable vessel in the British mercantile marine, and he declared, without fear of contradiction, that the Cunard Company held by far the leading position in the North Atlantic trade. They were carrying Scandinavians from the North Sea, Hungarians from the Adriatic, and Italians from Naples; but most of all they must be congratulated upon their success in establishing good relations with the other great lines in the North Atlantic trade.



STEAM CAR FERRY FOR N. T. R.

IN a previous issue of *Marine Engineering of Canada* reference was made to the contract for building a steam car ferry, which has been let by the National Transcontinental Railway Commission to Cammell, Laird & Co., Birkenhead, England. We are now able to give some detail particulars of the vessel, which will be used for the transportation of trains across the St. Lawrence, near Quebec City, pending the completion of the Quebec Bridge.

The principal dimensions, etc., will be as follows:—Length on water line, 304 ft.; length over fenders, 326 ft.; breadth extreme, 66 ft. 9½ ins.; depth moulded, 23 ft.; mean draught with train load of 1,285 tons (gross), 15 ft.; speed, with train load of 550 tons (gross), 15 miles per hour. The ferry will have twin screws, with a third ice-breaking propeller fitted at the forward end, so as to enable the service to be undertaken at all seasons of the year.

The trains will be supported on three lengths of track carried on a tidal deck; the length of each track being about 272 ft. The tidal deck will be supported on columns, and manipulated by means of screw shafting, so that it may be raised or lowered at the rate of 1 ft. a minute when fully loaded, the total range being 18 ft. At each end of the tidal deck, an adjustable hinged gangway, 28 ft. long, is to be fitted, suitable for the conveyance of the trains to and from the land tracks. The tidal deck will be raised or lowered by vertical screws hanging in suspension and working on ball bearings.

Above the highest position of the cars on the tidal deck there will be a promenade 4 ft. wide, arranged all round the vessel. Accommodation will be provided on the platform deck below the upper deck forward on port side for captain, mate, chief engineer, second engineer, 4 deck hands and 6 firemen, with galley, mess room and cook's room on starboard side.

The vessel will be built under special survey, in accordance with the requirements of Lloyd's Register, and be class-

ed 100 A1, with special strengthening for crossing the St. Lawrence in winter and for breaking ice at the landing berth. Heating, ventilating, hot and cold water service, and electric lighting of the most modern and approved kind will form part of the general equipment.

The main propelling machinery will consist of two sets of triple expansion surface condensing engines, exhausting into one condenser, and eight single ended cylindrical boilers of the return tube type worked under natural draught. The main engine will have cylinders of the following sizes:—Diameter of high pressure cylinder, 23 ins.; diameter of intermediate cylinder, 35 ins.; diameter of low pressure cylinder, 55 ins.; stroke, 33 ins. The machinery for the forward ice propeller will be one set of direct acting, inverted, compound surface condensing engines of the following dimensions: Diameter of high pressure cylinder, 15 ins.; diameter of low pressure cylinder, 32 ins.; length of stroke, 21 ins. The working pressure will be 165 lbs. per sq. inch.

Delivery of the vessel is to be made at Quebec Harbor on or before May 15, 1914.



ATLANTIC ICE PATROL.

AMONG the lines contributing towards the support of the ice scoutship *Scotia*, the following may be accepted as the most prominent:—Allan, American, Anchor, Atlantic Transport, Austro-American, Compagnie Generale Trans-Atlantique, Canadian Northern Railway, Canadian Pacific, Cunard, Dominion, Donaldson, Hamburg-American, Holland-American, Leyland, Norddeutscher Lloyd, Red Star, Russian-American, Scandinavian-American, and White Star. There are perhaps two or three more, the names of which have not transpired.



THE MOTOR SHIP "FORDONIAN."

THE new motor cargo ship *Fordonian*, built for service on the Canadian Lakes, ran trials on the Firth of Clyde some time ago, and will arrive in Toronto shortly. The vessel was launched by the Clyde Shipbuilding and Engineering Co., Port Glasgow, last September, and has been laid up at Greenock during the winter.



Port Stanley, Ont.—Work will soon be commenced by the Government on improvements to Port Stanley Harbor. The original plans are for a breakwater along the east side, 100 feet long. The harbor is to be deepened sufficient to admit boats with a draught 18 ft. 7 ins. Major H. J. Lamb, Windsor, is the Government representative in Western Ontario.

MONTREAL'S FLOATING DRY DOCK.

WILL the big floating dry dock, the "Duke of Connaught," prove a white elephant in the port of Montreal? Shipping men are not too positive that such a fate will not overtake it, and some are quite certain that under prevailing conditions it will never be a very profitable enterprise. It is a magnificent piece of machinery and equipment, but wage scales, scarcity of labor and climatic conditions are said to be against its success.

An Example.

The Elder-Dempster liner *Benquela*, en route to Montreal, requires scraping and painting, an operation that makes dry docking of the ship necessary. The dry dock people wanted \$700 to berth the ship for the first day, with a reduction daily for each succeeding day the vessel is detained. They, however, consented to reconsider the price rate, but the owners of the ship said the rate was too high, so she will dock at Natal, South Africa.

High Wages.

The local company reckoned on painters' wages of 40 cents an hour and a four day undertaking. In South Africa the work will be done in one day, and at a cost of about 15 cents an hour. The scarcity of labor in Montreal and its high price proved too much for the ship owners. In Natal labor will be abundant, and the vessel will be ready for sea within 24 hours after going into dock, and that, too, at a minimum cost.

The Local Situation.

Such is the situation that the local company has to face. Labor is more abundant on the other side of the ocean; wages are lower, and the work can be rushed through. That means much, too, for an ocean liner, for every day she is off her run costs a pretty penny. Then, too, climatic conditions are opposed to the big drydock. If a ship suffers injury late in the season, the owners are liable to patch her up sufficiently to cross the Atlantic for repairs during the winter months. If caught unfinished on this side, she has to remain until the following spring. A sample of the fear of being held up all winter was the rushing to England of the stranded C. N. R. ship *Royal George* last fall after temporary repairs at Quebec and Halifax.

"I fear," said one shipping man recently, "that the local dry dock will be used only in extreme cases. It costs too much to dock in Montreal. The owners of the dry dock have to have a profit, but wages are so high and labor so scarce that it makes an enormous bill for the vessel owners."

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Edward Williams and Wm. Bright fell into the hold of the steamer Corunna at Toronto, two weeks ago, and were seriously hurt.

Andrew McMahon, aged 74 one of Kingston's oldest residents dropped dead, on May 22, from heart failure. He was prominent in marine circles and made many charts used on the Great Lakes. He was known to mariners all over Canada and the States.

Peter J. Shaw, master of the big freighter, W. D. Matthews, was on April 28 presented with a silk "top hat," by the Fort William Board of Trade in commemoration of the opening of up-coming navigation, when the Matthews steamed into the harbor.

Captain Olsen won the bonus of \$100 for the first steamship to arrive in Montreal for the season from an ocean port. He steamed into port on Saturday, April 19th, in command of the Dominion Coal Co.'s steamer "Wacouta," after being compelled to anchor in the middle of Lake St. Peter because of a snowstorm.

Major H. J. Lamb in charge of the Government Public Works for Western Ontario, states that everything that the deputation from London, St. Thomas, Port Stanley and other municipalities asked for two years ago in the way of harbor improvement at Port Stanley, will be carried out. The length of the breakwater to be built will be 1,000 feet.

Inspector Hurst, of Collingwood, has received official word from the Government to take the soundings of the Thornbury harbor, and make his report in order that a start may be made to spend the \$24,000 voted by the Government for the improvement of the waterfront. A large pile-driver is being sent and it is assumed that the work will be chiefly along this line.

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

ASSOCIATIONS

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Secretary—Jas. Morrison, Montreal.

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President—A. A. Heard, Albany, N.Y.
Secretary—M. R. Nelson, New York. . . .

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President—A. A. Allan, Montreal; Manager and Secretary—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

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Thos. Theriault, Levis, P.Q., Grand Vice-President.
Neil J. Morrison, P.O. Box 238, St. John, N.B., Grand Secretary-Treasurer.
Jno. A. Murphy, Midland, Ont., Grand Conductor.
George Bourret, Sorel, P.Q., Grand Door-keeper.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

Captain Archibald Reid, the Montreal Port Warden, has returned from a tour in the United States, and reports to the Board of Trade that the rules of the port of Montreal are not more stringent than those of certain ports in the United States. One of his remarks was that where colored labor was available the charges for work were less than in Montreal, and that in ports open all the year round the charges would be slightly in their favor, because continuous employment could be given.

H. I. Mathers, Norwegian Consul at Halifax, has received a communication from the Consul General at Montreal, informing him that His Majesty King Haakon of Norway has been graciously pleased to confer the Royal Norwegian silver medal for noble deeds on Capt. J. T. Martell, W. A. Martell, Geo. Harris, John Wadden, Patrick Wadden, Robert Parsons, Jos Trim, George Hyde and A. M. Spencer, they being the crew of the lifeboat belonging to the life saving station at Scatarie Island. He has also awarded a silver cup, with suitable inscription, to Benjamin Pope, John Pope, and Wm. Martell, in recognition of their having participated in the rescue of the crew of the Norwegian barque Record, of Tydestr, which was totally wrecked on Mainadieu bar on Sept. 12, 1911.

OCEANIC STEAM NAVIGATION CO. DIVIDEND.

OWING to the loss of the steamer Titanic, the laying up of the steamer Olympic for repairs, and because of labor disturbances, the annual dividend of the Oceanic Steam Naviga-

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto,	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John,	2	E. Berry,	50 Douglas Ave.,	G. T. G. Blewett,	65 Harrison St., St. John, N.B.
Collingwood,	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex. McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	Andrew T. Roy,	1212 Burrard St.,	E. Read,	859 Thurlow St.
Levis,	8	Helaire Mercier,	3 St. Joseph St.	S. G. Guenard,	Blenville, Levis, P.Q.
Sorel,	9	Geo. Gendron,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	11	Alex. McDonald,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor,	12	Jos. Silverthorne,	28 Crawford Ave.	Neil Mattland,	221 London St. W., Windsor, Ont.
Midland,	10	W. Robertson,	Midland,	Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault Ste. Marie,	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown,	15	F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottet'n, P.E.I.
Twin City,	16	Arthur Abbey	Fort William, Ont.	John A. Smith,	Fort William, Ont.

tion Co., owners of the White Star Line, is only one-half that paid last year. The dividend for 1911 was 60 per cent. The company paid a dividend of 30 per cent. in March, but owing to the loss of the Titanic and other troubles, no final dividend was recommended. A sum of \$540,790 written off on account of the sinking of the Titanic is described as "the proportion of loss on the first cost of the Titanic. The report of the directors expresses regret at the retirement of J. Bruce Ismay as managing director of the White Star Line.

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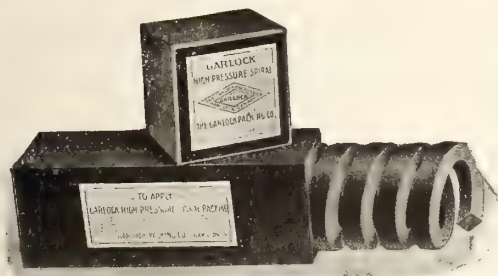
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THE PROVISION OF LIFE-BOATS.

THE British Board of Trade recently issued the revised draft rules for life-saving appliances at sea, of which the first draft appeared last autumn. Some changes have been made, presumably in accordance with recommendations by the Boats and Davits Committee. The following table shows the requirements now made as to the provision of davits, the number being regulated by the length of the vessel:—

Length of Vessel in Feet.	Minimum Number of Sets of Davits.	Minimum Number of Open Boats to be Attached to Davits.
Under 160	2	2
160 and under 190	3	3
190 " " 220	4	4
220 " " 245	5	5
245 " " 270	6	6
270 " " 300	7	7
300 " " 330	8	8
330 " " 360	9	9
360 " " 390	10	10
390 " " 450	12	12
450 " " 510	14	14
510 " " 590	16	16
590 " " 670	18	18
670 " " 750	20	20
750 " " 840	22	22
840 " " 940	24	24
940 " " 1040	26	26

The above rules are to apply to home trade boats of Class I., and with some exceptions to Class V., and to foreign-going passenger steamships. The Board of Trade reserve the power to insist upon the introduction of some better methods of handling boats than is provided by davits in cases where the height at which the boats are carried is great, or in other such circumstances as they may think fit. The number of life-boats, or approved substitutes therefor, to be carried must provide accommodation for every passenger. The life-boats in davits must be of the open type, pointed at both ends, and provided with air-chambers. Decked boats may be stowed underneath the boats in davits, in sets of three, and where more than four life-boats are carried, one or two square-ended boats may be substituted for the regular pattern. Motor life-boats may be fitted, but their use is not encouraged by the Board of Trade, the regulation merely providing that if the total number of life-boats is between four and ten, one may be a motor life-boat; but this substitution is purely optional on the part of the shipowner, who is offered no inducement whatever to supply a boat of this type.

The cubic capacity of the open boats is taken to be the product of the length, breadth, and depth by 0.6, subject to the provision that the depth taken for calculation shall never exceed 45 per cent. of the breadth; 10 cubic feet will in general be required per passenger, but each boat will be subjected to an actual test before being certificated.

The regulations provide that where it is not practicable or reasonable to fit the davits prescribed, the number may be reduced at the discretion of the Board

of Trade, and a similar discretion may be exercised with reference to the provision of life-rafts and buoyant seats; but this clause is probably put in merely for "window-dressing" purposes, to satisfy the public that nothing unreasonable will be demanded. It is, however, most unlikely that the officials concerned will take any more responsibility than they can help, so that every clause of this kind is in practice likely to prove a dead letter.

Some concession is made with respect to boats engaged in daylight voyages in home waters and cross-Channel passages during the period between March 20 and September 30. In this case, the provision demanded in boats and rafts is to be sufficient for 80 per cent. of the maximum number of the passengers carried. For passenger vessels making short runs in home waters specially scheduled by the Board of Trade, or engaged in excursion traffic between June 1 and August 31, a reduced number of davits is demanded, and a reduction made in the life-boat capacity required. Thus, ships under 180 ft. in length need not have more than two sets of davits, and a vessel 360 ft. long need not carry more than eight sets of davits. The corresponding life-boat capacity is 300 cubic ft. for vessels of between 100 ft. and 120 ft. in length, and 2,400 cubic ft. in vessels of between 330 ft. and 360 ft. in length.

For boats making, during the summer, short excursion trips to sea, a further reduction is made in the number of davits required, and the total accommodation of boats, rafts, and the like, need not suffice for more than 70 per cent. of the passengers. If the excursion is confined to partially smooth water, this figure is further reduced to 60 per cent., and if wholly in smooth waters to 40 per cent.—Engineering.

CANADA NINTH IN WORLD SHIPPING.

IN the number of vessels and volume of tonnage, Canada's shipping last year showed a substantial increase. The total number on the register books was 8,380, measuring 836,278 tons; an increase of 292 vessels and 65,832 tons, compared with 1911. The number of steamers was 3,667, with a gross tonnage of 641,225. Assuming the average to be \$30 per ton, the value of the net registered tonnage of Canada at the end of 1912 was \$25,088,340. The number of new vessels built and registered during the year was 420, the tonnage 34,886, and the value \$1,569,870. During the year 241 vessels were removed from the register books. It is estimated that 42,490 men and boys were employed on ships registered in Canada during 1912.

Canada occupies now the ninth position in the shipping of all countries, Great Britain and her colonies being first with 12,580,488 tons, Germany second with 3,034,144, and the United States third with 2,617,791. In new shipping last year, Ontario led with 11,170 tons, British Columbia being second with 10,647, Nova Scotia third with 5,853, and Quebec fourth with 5,744. Wrecks numbered 19, strandings 10, and total losses 19.



MONTREAL HARBOR AUTHORITY.

THE decision of the Montreal Commissioners to place the shipping in the port under two virtually distinct heads is exciting a good deal of comment—and that, too, of an unfavorable nature—among navigation companies. Just how it will work out no one can tell accurately, but there are not a few who know the port intimately who prophesy disaster and dire confusion. In fact, some of them do not hesitate to affirm that, if the scheme proves unworkable, they will carry the matter over the heads of the Harbor Commissioners to the Hon. J. D. Hazen, Minister of Marine and Fisheries, at Ottawa.

Unity, they say, is one essential of a great port like Montreal, and such cannot be if there are two harbor-masters working practically independent of each other. The division of the harbor at Victoria pier, can result in only one thing, they affirm—the injury of the harbor. There should be one harbor-master, a man of wide experience and known ability who would reign supreme, without interference, from one end of the port to the other. In reply to the Harbor Commissioners' statement that the port is too big for one man to handle, it is answered that Liverpool has seven miles of docks, and these are in charge of one supreme authority and the scheme works well.

Whatever the outcome may be, shipping men are far from pleased with the prospects that arise from a divided port.



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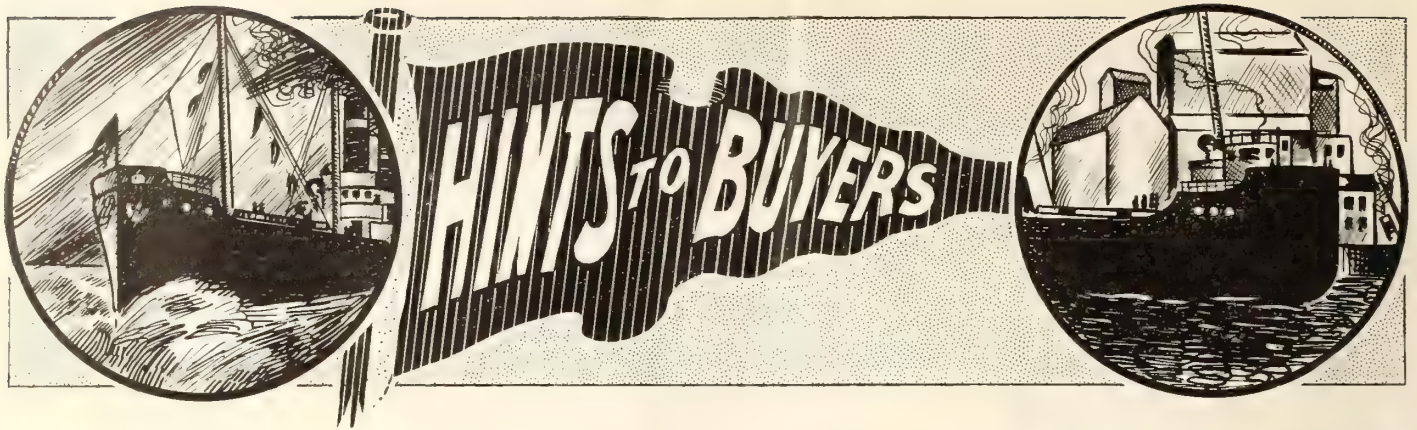
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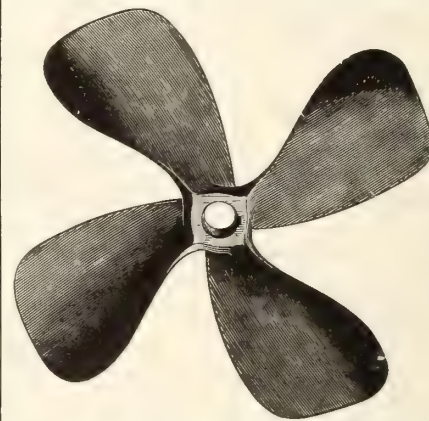
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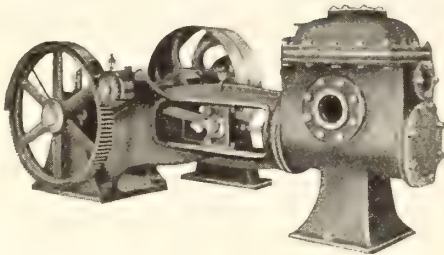


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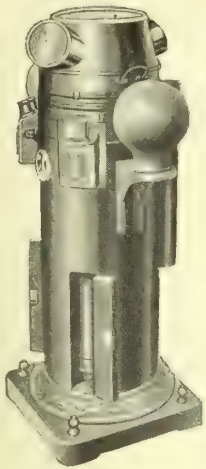
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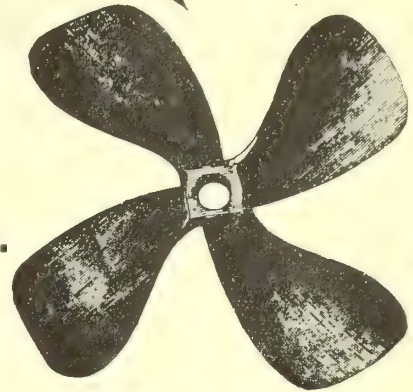
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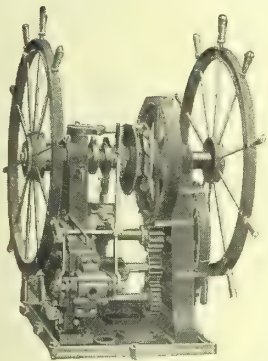
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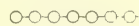
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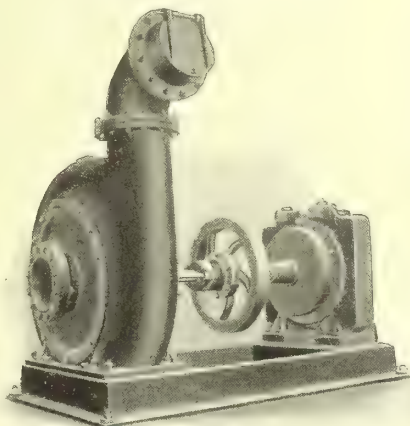


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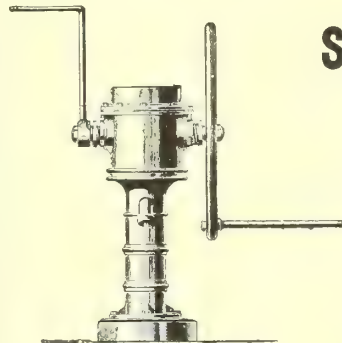
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No. 6

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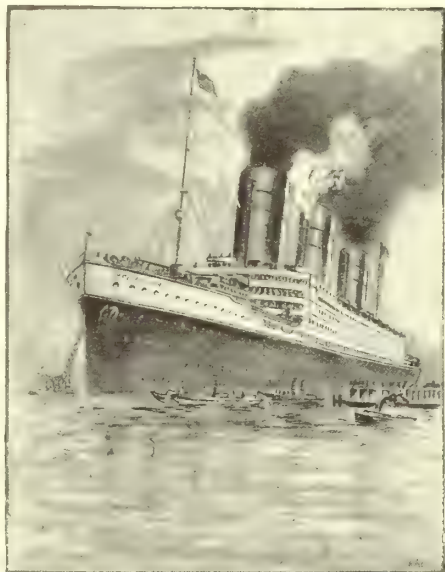
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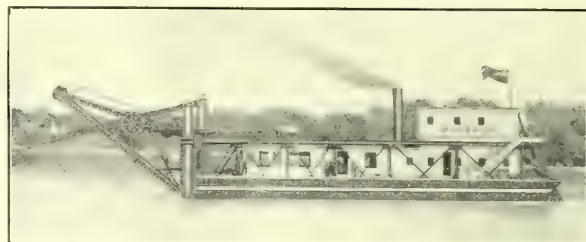
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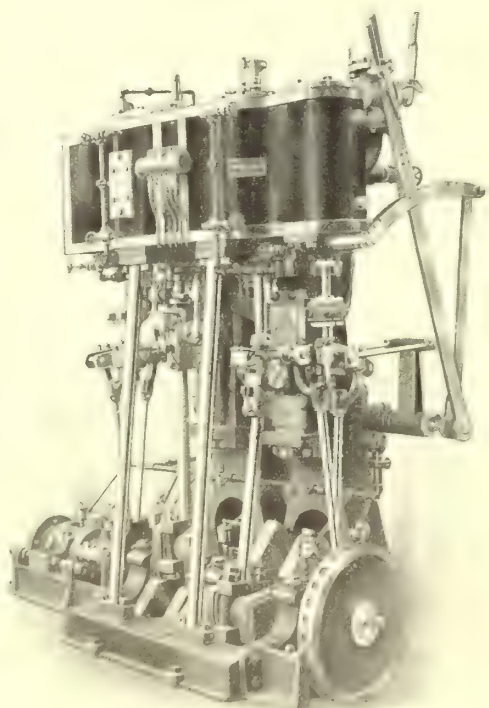
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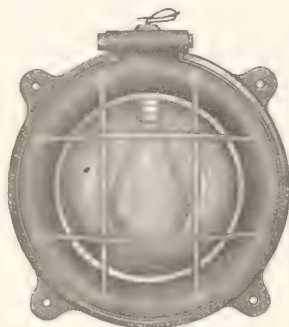
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Launch of the Northern Navigation Co. Steamship "Noronic"

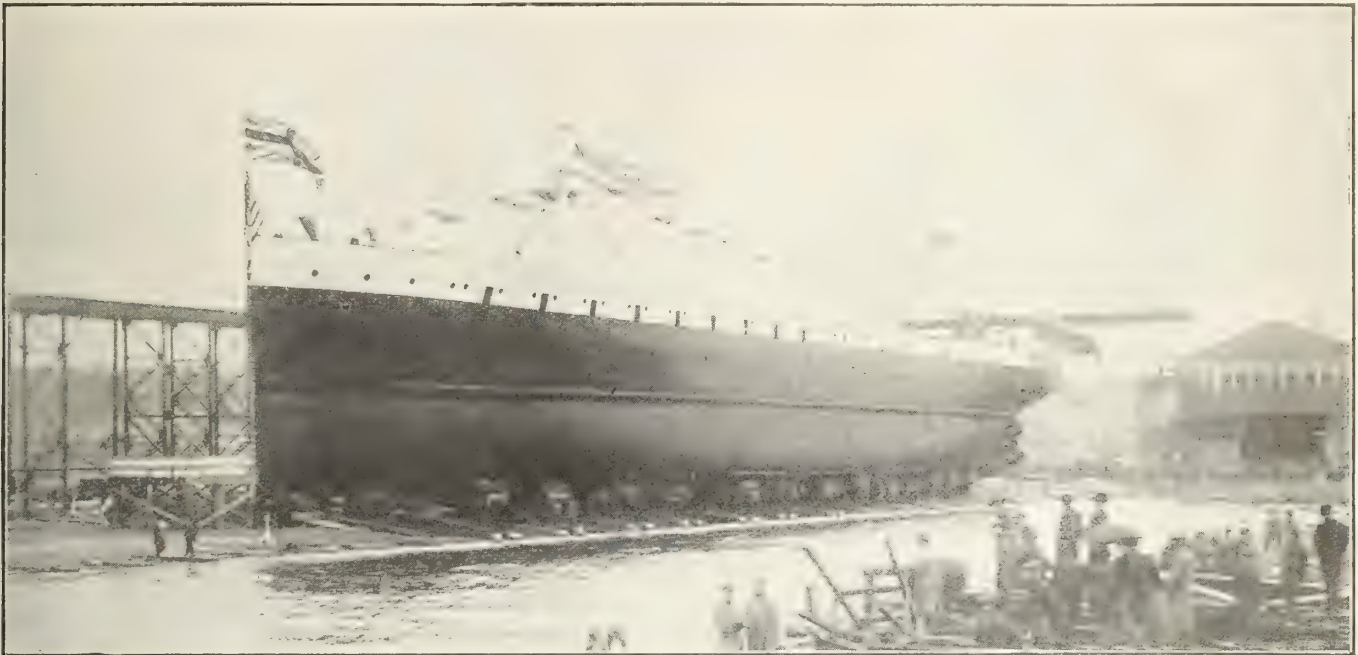
Another tribute to the progress, development and achievement of Canadian shipbuilding and marine engineering enterprise falls to be recorded. Last month we featured the launch of our largest home built and owned lakes freighter, while in the present instance our largest home built and owned lakes passenger vessel is the theme.

ON Monday afternoon, June 2, there was launched from the yard of the Western Drydock and Shipbuilding Co., Port Arthur, Ont., the single screw passenger steamship Noronic, which has

party of ladies and gentlemen, among whom were the following:—

J. R. Binning, Montreal; Mr. and Mrs. Grant Morgan, Toronto; Mr. and Mrs. Edmund Bristol, Toronto; Hon. J.

bert, Montreal; J. P. Stedman, Hamilton; H. R. Charlton, Montreal; Mrs. J. A. Gemmill, Ottawa; Mrs. James Bell, Montreal; Mr. Stuart Bell, Montreal; Mr. and Mrs. D. L. White, Midland;



THE NORTHERN NAVIGATION CO. STEAMSHIP "NORONIC" ON THE WAYS PREVIOUS TO LAUNCHING.

been built to the order of the Northern Navigation Co., and will rank as their flagship. The christening ceremony was performed by Mrs. Edmund Bristol, Toronto, and was witnessed by a large

P. Casgrain, Montreal; F. A. Magee, Hamilton; Mr. and Mrs. George Stark, Montreal; Frank Carroll, Quebec; W. G. Ross, Montreal; T. P. Phelan, Toronto; Sir George Garneau, Quebec; Paul Gali-

Mrs. W. H. Featherstonhaugh, Midland; Mr. and Mrs. Jas. Prindiville, Chicago; Mrs. David McKean, Midland; R. I. Powers, Sarnia; Mayor Oliver, Port Arthur; President King, Port Arthur



THE NORTHERN NAVIGATION CO. STEAMSHIP "NORONIC" TAKING THE WATER.

Board of Trade; President Wilson, Fort William Board of Trade; and Mr. James Carruthers, President of the R. & O. Navigation Co.

Previous to the launch a luncheon was served on board the Northern Navigation Co. steamship *Hamonic*, at which, in addition to the already mentioned guests, prominent marine and shipping men were present. The shipbuilders were represented by the president, Mr. James Whalen, and by the general manager, Mr. L. K. Wallace. Speeches were made by different officials and the Mayors of Port Arthur and Fort William, fitting to the occasion, and all were complimentary to the excellence of the work done by the Western Dry Dock Company, and to the aggressiveness of the Northern Navigation Company.

Vessel Features.

The hull of the vessel has been built of steel to Lloyd's requirements, on the Isherwood construction system, and the leading dimensions of the ship are 385 ft. length over all; 362 ft. between perpendiculars, 52 ft. beam, and 28 ft. 9 in. moulded depth. There are 5 steel decks—main, spar, promenade, observation and boat. The freight hold is divided into four watertight compartments, and there are eight watertight bulkheads, as well as a double bottom. On the observation deck are the dining and observation rooms, running the whole length of the deck. Two hundred and eighty-six passengers will be able to sit down to meals at one time. On the boat deck are located the officers'

quarters and pilot-house, suites of private cabins, officers' mess-room, writing-room for crew, firemen's mess, recreation-room for colored help, etc. The woodwork throughout will be mahogany and oak of the best grain and finish, with hand decorated panels.

Accommodation is provided for 600 first-class, 240 second-class passengers, and about 200 crew. Fourteen lifeboats will be carried. All state-rooms are supplied with hot and cold running water, electric lights, call bells, etc.

Machinery Equipment.

The propelling machinery consists of one set of triple expansion vertical engines, having cylinders, 29½, 41½ and 58 inches diameter by 42 inches stroke. Steam is supplied by 5 Scotch boilers, 4 of these being 15 ft. 6 in. diameter by 11 ft. long, and one 12 ft. 6 in. diameter by 11 ft. long. The working steam pressure is 200 pounds per square inch, and the furnaces are arranged for forced draft. The engines are expected to develop 5,000 I.H.P., and to propel the vessel at a speed of 20 miles per hour.

Electric light, refrigerating, ship and freight handling machinery of the latest and most approved types have been installed in the vessel, together with a wireless telegraphy installation.

Work on the construction of the *Noronie* commenced in January of this year, and she will be put into commission at the opening of 1914 navigation on the Great Lakes.

GREAT LAKES TRAFFIC.

THE suggestion has been put forward at Washington that negotiations should be entered into with Canada and Great Britain for the purpose of combined action with a view to the improvement of the passage between the Great Lakes and the Atlantic seaboard. This was proposed as an amendment to the Reciprocity Bill, but withdrawn. It is again, however, before the Foreign Relations Committee of Congress in the form of the following resolution:—"Resolved that the President be requested to enter upon negotiations with Great Britain or the Dominion of Canada, so as to arrive at, if practicable, an international agreement for the concurrent or co-operative improvement of navigation in waterways used, or which can be used, as common for the commerce of Canada and the United States."

The opinion is that, if such an arrangement could be effected, the cost to the different parties concerned would be considerably reduced, and that ocean-going vessels of fairly large size would soon be able to dock at Duluth, Fort William, and other ports in the interior of the North American Continent. As, however, Canada has at present several big schemes in hand, notably the deepening and widening of the Welland Canal, between Lakes Erie and Ontario, for which tenders are to be invited shortly, and the construction of a waterway from Georgian Bay on Lake Huron, to the St. Lawrence, it is not expected that the plans formulated by a number of United States legislators will meet with approval in the Dominion.



THE NORTHERN NAVIGATION CO. STEAMSHIP "NORONIE" AFLOAT IMMEDIATELY AFTER THE LAUNCH.

MONTREAL PILOTAGE REGULATIONS.

AN Order-in-Council has been adopted amending the pilotage regulations of the district of Montreal, so that in future no agent or firm having only one vessel, or a monthly service of one vessel only, shall be allowed to engage a special pilot for that service, but may be authorized to arrange with another agent or firm in the same position to secure the services of a special pilot to be employed jointly by both agencies.

Failing such authorization, agents or firms so situated will be obliged to fall back on the services of a pilot taken according to rotation from the tour-de-role. It is hoped the new order will have the effect of enhancing the experience and remuneration of pilots on the tour-de-role, which was the reason assigned by the Pilotage Commission for making the recommendation which the Dominion Government has adopted.

CAPT. HOY'S APPEAL.

THE appeal of Capt. Hoy, formerly master of the Bengore Head, against the sentence of the Dominion Wreck Commission Court, held at Quebec on October 17, 1912, was heard in the Admiralty Court in London on May 23, and the appeal was allowed.

The evidence showed that when the Bengore Head stranded in the vicinity of Shoal Cove, near Flower Island, in the Straits of Belle Isle, on October 5, last year, Captain Hoy had been on duty for 30 hours, in consequence of foggy weather, and had actually been on the bridge for 20 hours. At 2 o'clock on the afternoon of the day in question the fog had completely cleared, and the land was plainly visible, the straits being about ten miles wide. The Bengore Head was proceeding down on the starboard side of the channel on a course N. 86 E. by compass. He then called the second officer and told him to keep that course until he got abeam of Flower Island Lighthouse, and said: "When you get there, provided you keep three miles off, you can port to S. 81 E." The master added that he was going to lie down for a couple of hours, as he expected to be through the ice track on the following night, and would have to be on duty again.

The second officer, who possessed a chief mate's certificate, had been in the ship nine or ten months, and had been on that trip three or four times. The master then turned in and fell asleep, and at 3.42 was awakened by feeling the vessel going aground. It was found she

had taken the ground near Shoal Cove. The second officer's story was that there was a barque proceeding up, and he had to deviate from his course for her, and that he had ported to S. 85 E. for some time, and then ported again to S. 81 E., and began to see he was getting rather near the coast. If he had been on his proper course he would have been four and a half miles away. He next starboarded a little and took a bearing, afterwards going down to the chart-room to verify it. He got frightened when he realized the position of the vessel, and, rushing up, ordered "starboard," but it was too late. The vessel remained ashore some hours, but by jettisoning some of her cargo she eventually got off.

Suspension Quashed.

The court allowed the appeal, and reversed the sentence of the local court which suspended Captain Hoy's certificate for three months. The president of the Admiralty Court, Sir Samuel Evans, said he saw no reason to suppose that the master was inaccurate, negligent, or over-confident in taking the bearing, and that in the circumstances the master was quite justified in going below after giving proper instructions to the second officer.

To find the master primarily responsible for the casualty under section 470 of the Merchant Shipping Act, the court obviously must find that it was caused by his wrongful act or default. This was not borne out by the evidence. The master's anxiety to clear his character was shown by the fact that the notice of appeal was given within six days, and his Lordship thought he was justified in this action. The decision of the court below must be reversed and the certificate restored as from the date of suspension.

Relative Correspondence.

The Guild has communicated with Lloyd's asking that the entries in their books regarding this suspension be erased, and the following letter has been received:—

"Lloyd's,

"2nd June, 1913.

"The Secretary,

"Imperial Merchant Service Guild.

"Dear Sir,—Re Captain J. C. Hoy.—I beg to acknowledge the receipt of your letter of the 30th ult., with enclosures regarding the return of the above master's certificate, and I have much pleasure in informing you that due notice has already been made of the decision in the High Court of Justice, and a copy of that decision has been posted in the records at Lloyd's.

(Signed)

"E. F. INGLEFIELD, Secretary."

The Guild also addressed a letter to Messrs. G. Heyn & Sons, managers of the Head Line of Belfast, owners of the "Bengore Head." Messrs. G. Heyne & Sons in their reply to the Guild state that "they are equally gratified with the Guild at the finding of the Appeal Court, and have intimated to Captain Hoy that it is their intention to retain his services."

ST. LAWRENCE SHIP CHANNEL.

ANXIETY is being caused in shipping circles by the comparative shallowness of the ship channel this year. The table issued at the Harbor Commissioners' offices, Montreal, early this month, showed that the depth of water in the ship channel throughout the harbor, on May 31, was considerably less than it has been on the corresponding date for years past.

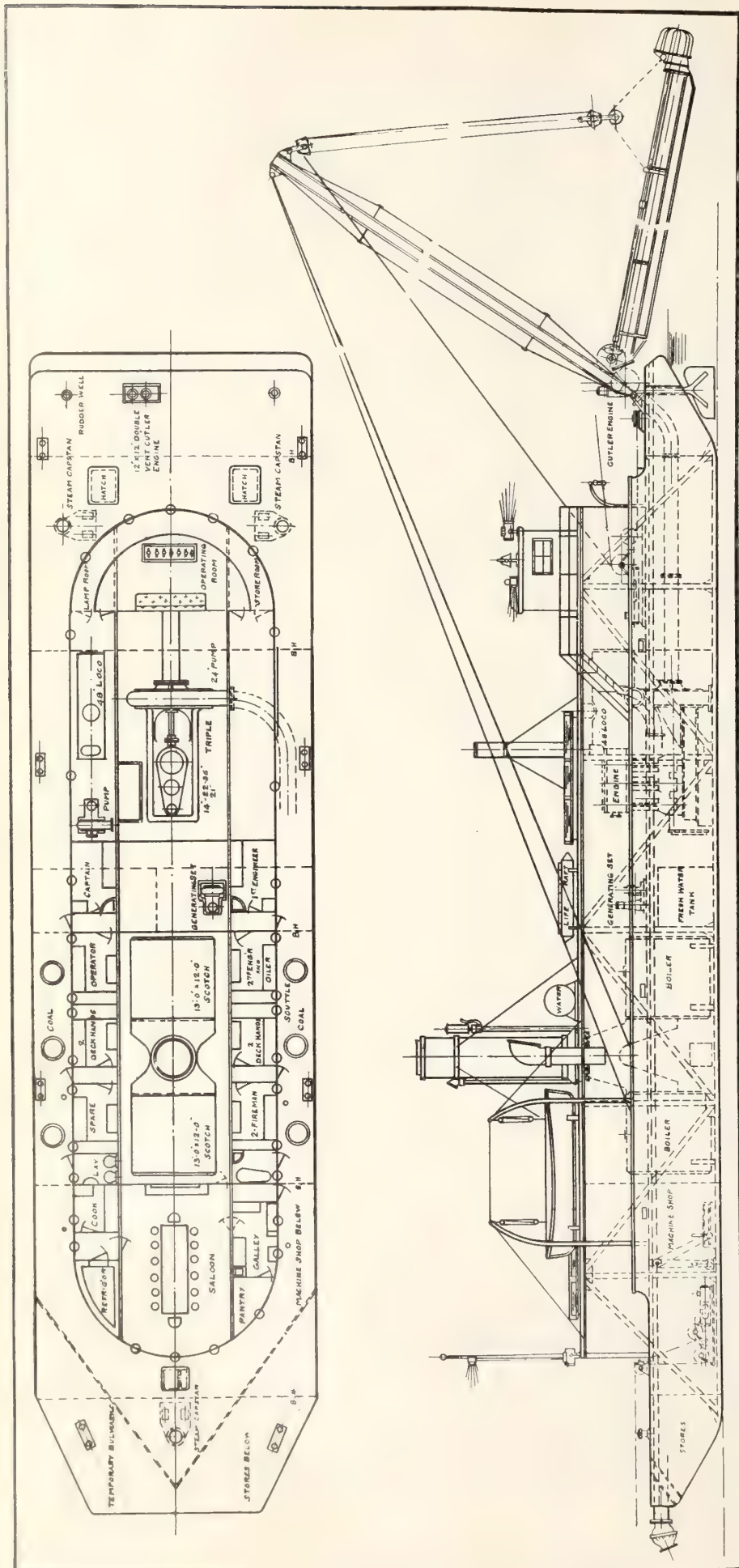
It was further stated officially that the average depth of the channel was 18 inches deeper for May last year than was the case during May, 1913, the difference in the depths for the present month, so far, is still more disquieting.

The mean depth for the first week of June, 1912, was 3½ feet greater than for the first week of the current month. Natural causes, such as difference in rainfall, and the fall of snow during the preceding winter, is held to account partially for the diminished depth, but many Americans admit that Chicago, though refused the increased supply from the Great Lakes for which she asked, is taking more water than she is allowed to do by law.

New York Shipping Illustrated says: "The Chicago Drainage Canal authorities are at present diverting more water than they are entitled to do, with a consequent lowering of levels at various points."

ENLARGING SOREL SHIPYARDS.

WORD comes from Ottawa that the Dominion Government is enlarging the usefulness of the much-discussed Federal shipyard at Sorel, Que. Instead of doing small repairs and turning out an occasional vessel for the St. Lawrence and Lower Canada coast work, the Sorel yard is likely before long to be building ships for all Canada. A steamer is under construction in the yards for use on Lake Winnipeg. It will be built in sections, shipped to Port Arthur and thence to Selkirk, and put together there. No satisfactory tenders were received for the construction of the vessel.



GENERAL ARRANGEMENT—PLAN AND ELEVATION—HYDRAULIC SUCTION DREDGE "PORT NELSON."

KNOTS AND HOURS.

NINE persons out of ten will say that such and such a steamship is capable of steaming at "twenty-five knots per hour." A nautical man would simply say "twenty-five knots." Now, which is correct? The latter, of course. The mistake arises from the fact that the landsman thinks that a "knot" is just the numerical term for a "sea mile," which is 6,082 feet, or about one and one-eighth land or statute miles. Now, a knot is not a distance at all; it is speed, and this "speed" combines distance and time. For instance, if we wish to speak of the speed of a train we refer to it as so many miles per hour. There is no single word in the language to express speed limits, so we must use two words—miles and hour.

The sailor has a language peculiar to himself, and he has invented a single word for a unit of speed. Thus a speed of one nautical mile per hour is called one "knot." Hence it is redundant to tack on "per hour" after the word knot when the word knot already includes "per hour."

MONTREAL PORT INSPECTION.

A VISIT of inspection was paid the port of Montreal, recently, by Hons. J. D. Hazen, Minister of Marine and Fisheries; Frank Cochrane, Minister of Railways, and Louis Coderre, Secretary of State. The Ministers were received by the Harbor Commissioners and conducted by them on a visit to the grain elevators and other works which are in progress adjoining the high-level wharves, after which the party embarked on board the tug Sir Hugh Allan, being accompanied also by Messrs. David Seath, secretary to the Harbor Commission, and F. W. Cowie, chief engineer. A tour of the harbor was made, the Ministers receiving explanations of the works now in progress while on board.

The floating ship dock, Duke of Connaught, was inspected, and the trip concluded at the entrance to the Lachine Canal, where the party disembarked. The Ministers expressed themselves as being well satisfied with the progress which is being made.

C. P. R. STANDS ALONE.

THAT no agreement exists between the C. P. R. and the Hamburg-American and allied lines is the gist of a denial made by Vice-President Bosworth, of the C. P. R., whose attention was drawn to apparently inspired statements in New York journals. The statements referred to were to the effect that an agreement in principle has already been arrived at between the rival corporations, and that a general and final understanding may be expected in the immediate future.

Description of the Hydraulic Suction Dredge "Port Nelson"

The building of this vessel gives point to the determination of the Canadian Government to go ahead with the building of the Hudson Bay Railway, and settles, at the same time, the location of its terminal port. The Polson Iron Works Co. are to be congratulated on the success of their efforts to have the dredge completed against an exacting time limit.

THE hydraulic dredge "Port Nelson," built by the Polson Iron Works, Ltd., Toronto, to the order of the Canadian Department of Railways and Canals, for service on Hudson Bay, at the terminal, Port Nelson, of the Hudson Bay Railroad, was successfully launched on Saturday, May 31, Mrs. W. H. Hearst, wife of the Minister of Lands, Forests and Mines in Ontario, performing the christening ceremony. The contract for the vessel was placed at the beginning of April of this year, and delivery has been called for in four months from that date.

Constructional Features.

The leading dimensions of the dredge are as follows:—Length, 180 ft.; beam, 44 ft.; depth at side, 11 ft.; draft, 6 ft.; while the material and scantlings conform, at least, with Lloyd's requirements. As will be noted from the accompanying line drawing, the dredge is of the scow model, with spoon bow, and circular bilges of 18 inches radius. As the dredge will be towed around the Labrador Coast to her destination, the design and structure throughout have been arranged to enable her to take this trip with safety, the shell plates being $\frac{1}{2}$ in. thick throughout, and the keel plates $\frac{5}{8}$ inch thick. The sheer strake extends 3 ft. above the main deck, and is surmounted by heavy steel bulwark rails, which lend additional longitudinal strength.

The deck stringers are $\frac{5}{8}$ inch thick, and the deck itself is of $\frac{1}{4}$ inch chequered plate, and is divided into three parts by two longitudinal watertight bulkheads. The

framing is exceptionally heavy, there being channel floors 10 inch by 25 pounds, located 20 inches apart. The side frames and deck beams are all of 6 inch by 15 pounds shipbuilding section, while the longitudinal girders are of 15 inch by 35 pounds channel, and the longitudinal truss frames of 12 in. by 25 pound channels. The hull is divided into six watertight compartments by five transverse bulkheads.

General Equipment.

Two 26 ft. metal lifeboats and two life rafts will be carried. An electric light outfit for ship lighting and searchlight service, together with a complete machine shop plant, consisting of air compressor, planer, lathe, drills, etc., so that the necessary appliances for effecting repairs required from time to time will be always available, also form part of the vessel's equipment. The discharge pipe is 24 inches in diameter.

The main engine for driving the pump is of the marine triple expansion type, the cylinders being 14 in., 22 in., and 36 in. in diameter by 21 inches stroke. There are two Scotch boilers, each 13 ft. diameter by 12 ft. long. In addition, there is an auxiliary boiler of the locomotive marine type situated on deck, this boiler being 48 in. in diameter by 14 ft. long. Alongside the latter is an 8 in. wrecking pump. The circulating water for the surface condenser is supplied by an 8 in. centrifugal pump driven by a 6 in. x 7 in. vertical engine, while the air pump is of the vertical simplex beam type. The feed and bilge pumps embody the latest practice.

For the purpose of raising and lowering the suction pipe there is provided on the main deck forward a 12 in. x 12 in. two-cylinder double-acting engine. The boom for raising and lowering the suction pipe is located at the suction end of the dredge. It is built up of steel shapes and plates throughout, and is 64 feet in length. Three capstans are provided, operated by 6 in. x 8 in. double-acting engines. The double-acting horizontal cutter engine has two 12 in. x 12 in. cylinders, and the cutter head is 5 ft. diameter. A spare cutter head, 4 ft. in diameter, will be carried. A general fire service pump, hand deck pump, and necessary hose to reach all over the ship, form other items of the general equipment.

The galley, dining room, cabin, and crew's quarters will be fitted up and furnished to suit the particular service requirements, and 3,000 feet of piping and pontoons for the discharge from this dredge will be put aboard. The contract price of the vessel was \$270,000.



PROBE OCEAN RATE.

THE Government is going to investigate during the Parliamentary recess the question of ocean freight rates to and from Canada. The increase in the past few years has been steady and marked, and claims are put forward by commercial bodies that the rates are exorbitant and affecting materially Canadian trade development. In the discussion of the subject during the session, an investigation was promised, and arrangements for it will not be delayed.



HYDRAULIC SUCTION DREDGE "PORT NELSON," ON THE WAYS PREVIOUS TO LAUNCHING.

LIFE SAVING.

THE art of life saving and resuscitation is to be more widely taught this summer than ever before in the province of Quebec if the plans of the executive of the Quebec Branch of the Royal Life Saving Society are carried out. Should those concerned be found willing, it is the intention to give week-end demonstrations at all the towns and villages from the end of the Island of Montreal on the north shore, down as far as Three Rivers. Letters are being sent out to the priests of the various parishes of Berthier, Lanoraie, and the other places down the river, with a view to interesting them in the plan, and if they would convey the suggestion to their parishioners, it is thought a lot of interest would be aroused. The R. L. S. S. will also be well represented at the various Lake Shore regattas this season, when it is the intention to give demonstrations.

July 1st will probably mark the formation of a new branch of the R. L. S. S. at Halifax. Mr. Louis Rubenstein, the president of the Quebec branch, received a request to visit the City-by-the-Sea and start them off with an exhibition similar to those that have been put on in various western cities. Mr. Norris, the secretary, will probably also go down, and will be assisted by Messrs. Lyon and Vernot. They will leave Montreal on June 27.

BRITAIN'S LARGEST CUSTOMERS.

THE Board of Trade states the values of produce and manufactures exported by the United Kingdom to the leading foreign countries and the self-governing Dominions as follows:—

Germany	£40,362,767
Australia	£34,840,701
United States	£30,065,806
France	£25,585,681
Canada	£23,531,311
South Africa	£21,420,912
Holland	£14,281,668
Belgium	£12,193,306
New Zealand ..	£10,390,334

The Dominions buy very much more in proportion to their population, than do foreign countries.

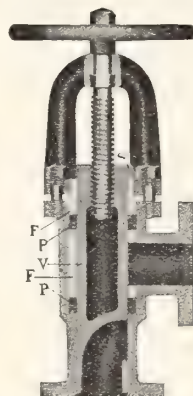
AN ENGINE BREAKDOWN.

IN the March issue of "Vulcan" some interesting illustrations are given of an engine breakdown, brought about by the failure of a cast iron crank. The engine, originally of the simple beam condensing type, was built as far back as 1856, being afterwards compounded by fixing a vertical high-pressure cylinder to the opposite end of the crank shaft. The high-pressure cylinder was

21in. diameter by 4ft. stroke, and the low-pressure 33in. diameter by 6ft. stroke. The engine ran at 36 revolutions per minute, and drove the load by means of gearing. It had worked under these conditions for many years, but a little while ago commenced to give trouble on the high-pressure side, owing, in all probability, to a change in alignment caused by yielding of the foundations, connections, etc., and eventually the cast iron crank broke suddenly through the crank pin eye, smashing the high-pressure cylinder and numerous other parts. The illustrations showed that the broken crank was weakened to a great extent by a cotter hole for receiving the crank pin cotter, and on examination after the breakdown the metal showed signs of fatigue and gradual fracture.

A SEATLESS BLOW-OFF VALVE.

PROBABLY there is no valve in the plant that gives as much trouble as the blow-off, and when you consider the amount of grit and scale that has to pass over this valve seat every time the boiler is blown down, the only wonder is that it does not give more trouble



A SEATLESS BLOW OFF VALVE.

than is usually experienced. It takes but a short time for a blow-off to dribble away five or ten dollars' worth of hot water once it begins to leak; besides this, the continual expense of re-grinding or renewing valve seats has to be taken into consideration, to say nothing of the time and labor spent in trying to put it in something like serviceable condition.

Engineers have become so used to blow-off trouble, however, that they naturally look for it, and probably won't be happy without it in some cases. It is one of the necessary evils—so looked upon by engineers, because they can't see any way to remedy it. The thing that gives trouble is the valve seat, and the thing to be overcome is to eliminate the seat, and yet make a tight valve; one that will stay tight, not the first day, or week or month, but for years.

The simplex seatless blow-off valve is claimed to have successfully fulfilled these two requirements; and, as will be seen by the illustration, it is a very simple arrangement. No special directions are required for operating or cleaning, it being only necessary to operate the handwheel. In closing, shoulder (S) on plunger (V) engages loose follower gland (F), and compresses packing (P) above and below port, making an absolutely tight valve.

The Garlock Packing Co., Hamilton, Ont., are the Canadian distributors of this valve.

Resuscitation, by Dr. Chas. A. Lauffer, Medical Director, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.—This book includes a reprint of a paper on this subject delivered by the author before the Philadelphia Section of the National Electric Light Association. The author, after explaining a number of successful results which have been obtained from employing resuscitation methods on men who were supposedly dead, gives a clear description of the mechanism of respiration, illustrating same by a number of views of the various parts of the anatomy. The Prone Pressure or Schafer method of resuscitation which has been adopted by the National Electric Light Association, and a number of other Engineering Societies, is described in detail. The book brings out, in a clear, concise manner, the necessity of people in general being versed in the principles of resuscitation, and clearly shows how they can be taught, so as to prove of valuable assistance to persons in the ordinary walks of life.

Port Stanley, Ont.—Improvements now being carried out by the Department of Public Works, Canada, at Port Stanley, include the construction of a breakwater 1,200 feet long to protect the entrance to the harbor from the south-east. This work has been in progress since last spring, and it is anticipated that with fair weather it will be completed this fall. The work is of a permanent character, being close-faced crib work filled with stone ballast for substructure and concrete for superstructure, and the reconstruction of the westerly landing pier with a design of reinforced concrete. The dredging is practically completed, both at the entrance to and in the harbor, and there is now sufficient depth to permit vessels to draw 19 feet at low water.

A good salesman is like a good cook, he can create an appetite when the buyer isn't hungry.

A NEW GOVERNMENT STEAMER LAUNCHED AT QUEBEC.

ON May 20 there was launched from the shipyard of Geo. T. Davie & Sons, Levis, Quebec, the handsomely modelled Canadian Government hopper barge No. 1, built for services in the River St. Lawrence. The vessel is the first of its kind to be constructed on Canadian soil, and is the pioneer of a large fleet to be built in the near future for assisting in the increased dredging operations of the river. The dimensions of the vessel are as follows:—

Length B.P., 180 ft.; beam, 32 ft.; depth, 14 ft. 6 in.; draught, 12 ft.; and gross tonnage, 850 tons.

The vessel is classed 100A1 at Lloyd's for river service, having been built,

I.H.P., consists of one set of triple expansion engines, having $14\frac{3}{4}$ x 24 x 38 inch diameter cylinders, x 22 inch stroke, steam being supplied by two horizontal multitubular boilers, 10 feet diameter by 10 feet long, working at a pressure of 180 lbs. per square inch. There are two feed pumps of Weir's vertical direct acting type, fitted in connection with Weir's air pump, feed heater, evaporator and filter. A Drysdale centrifugal pump furnishes the circulating water to the condenser; two large Weir general service pumps, two separate acting bilge pumps, one sanitary and one fresh water pump are placed in the engine room, and a patent ash ejector is fitted in the stokehold.

The deck machinery consists of a cap-

manner amid the cheering of a large crowd of interested spectators.

The berth lately occupied by the hopper barge will be used to build one of the six large scows, for which Geo. T. Davie & Sons received a contract recently.



WIRELESS STATION ON TORONTO ISLAND.

ALEXANDER C. LEWIS, secretary of the Toronto Harbor Commission, states that he had received word from the Minister of Marine and Fisheries, Ottawa, to the effect that a wireless station will be established at Toronto for service in connection with



CANADIAN GOVERNMENT HOPPER BARGE NO. 1, PREVIOUS TO LAUNCHING.

under special survey, and equipped according to Canadian Government regulations. The discharging arrangements consist of a series of six double doors on each side of the vessel, operated simultaneously or separately, the doors being of extra heavy design, and so arranged that when open they do not extend below the bottom of the hull. Accommodation for officers and crew is provided on the lower deck forward, and consists of large rooms for the officers, with a common mess room for all, and separate rooms for the seamen and firemen. Ample space has been provided for store rooms, etc., and the baths and lavatory arrangements show that more than the usual consideration has been given to the comfort of all on board.

The machinery, developing about 500

stan at the after end, a winch for operating the hopper doors, and a windlass on the forecastle deck for the anchors. There is also a steam steering gear controlled from the flying bridge, as also a complete installation of electric light throughout the ship. Steam heating, fresh water and sanitary service are also provided.

In appearance the new vessel represents the usual type of hopper barge, having a forecastle deck, main deck, bridges and gangway over the hopper with the machinery placed at the after end. The trial will, no doubt, prove the efficiency of the new barge, and from present appearances much credit is due the builders. The launching ceremony took place in the early hours of the morning, and was a complete success, the vessel taking the water in a graceful

steamers plying on Lake Ontario. This station will be on the Island beside the Lighthouse, the site recommended by the Toronto Harbor Commission, when it urged the Government last summer to enact legislation compelling all steamers to carry a wireless apparatus.

The legislation has been passed, and becomes effective after January 1, 1914. It provides that all steamers, whether registered in Canada or not, licensed to carry fifty or more passengers, going on a voyage of more than 200 nautical miles, and leaving a Canadian port, must be capable of transmitting and receiving messages over a distance of one hundred miles, and a fully qualified operator must be in charge. Vessels such as the Hamilton steamers, which are at no time out of sight of land, are exempt from the regulations.

MARINE ENGINEERING OF CANADA

WORK WANTED FOR DRYDOCK.

FOR years there has been an agitation to have a drydock at Montreal, the principal reason being that the insurance rates would be lowered because were an ocean liner, even one of the largest, injured, repairs could be made on this side of the Atlantic. The dock came, the insurance rates were lowered, but just how much the shipping men do not say.

F. Orr Lewis, president of the Canadian Vickers Co. declares that the big dock has not been given one cent's worth of work by the Canadian shipping companies, or by the English and foreign companies using the St. Lawrence route.

"There is plenty of work that we could do," he says. "There are enough big ships to keep our plant going to satisfy and enable us to have our staffs of men on hand, but the trouble is that the shipping men wish to keep us here, at a great loss to ourselves, just for emergency purposes, so that the insurance rates may be kept down, and lowered still more."

Drydock Agitation.

"The companies using the St. Lawrence route have been agitating for years

shipbuilding companies to establish a dock at Montreal. Every possible effort was made to have this done, but all the companies invited to establish the dock refused to do so, except the Vickers Company. We established the dock here believing, as we had been told, that we would be given the work. None has yet been given us, and the question is whether we will get it in the future.

"We want the Canadian shipping interests to give us encouragement, and to give us the business they promised. We have an expensive plant at Montreal, about two millions of dollars tied up, and even with the Government subsidy, we cannot fail to lose a great deal of money unless we get the work. The shipping men on the St. Lawrence evidently believe that they have the whip hand, now that they have got us here, and that we will stay here to be ready for the work of doing big "jobs" such as is done in big wrecks."

Might Take It Away.

Mr. Lewis stated that the Canadian Vickers Co. could sell its dock to-morrow, and to interests who would take it away from the St. Lawrence route. It is ridiculous to expect, he said, that the company will maintain a staff of men at

shipping interests to give their work to the dock established in Montreal. Labor here, said he, is high, and the prices for work are therefore higher in comparison with other places. For the sake of a few dollars they send their ships across the ocean to other places where there is cheaper labor.

NEW ICE-BREAKER.

PLANS are being prepared by the Marine Department for what is expected to be the largest and most powerful ice-breaking steamer in the Canadian service. A vote for the purpose was made last session, and Mr. C. Duguid, the naval architect, is now making the plans. The new ship will be not only an ice-breaker, built with a view to Canadian conditions, but also be equipped with a modern wrecking outfit.

The vessel's headquarters will be at Quebec, and she will be utilized on the St. Lawrence to facilitate the early opening of navigation, and the prolongation of the season. She will cost half a million dollars, and have a length of 275 feet, a beam of 66 feet, and a depth of 30 feet. The indicated horse power will be 10,000. The vessel will be built on



"DUKE OF CONNAUGHT" DRYDOCK WITH R. & O. STEAMER "MONTREAL" ABOARD.

for a drydock at Montreal," Mr. Lewis continued, "and as a result of their agitation several of the Canadian Ministers of Marine have endeavored for the past six or seven years to induce English

high wages idle most of the time just to help the shipping companies when there is an emergency job to be done.

Mr. Lewis explained the reason for the unwillingness of the Canadian

the lines of the Ermack, the Russian ice-breaker. An interesting feature of the contract will be a stipulation, designed to assist home industry, that the ship must be built in Canada.



TWO NEW C.P.R. STEAMERS.

THAT the contracts for the two new 5000-ton C.P.R. steamers, the proposed construction of which was announced a short time ago, have been let to William Denny Bros., of Dumbarton, Scotland, is the announcement made by local officials of the C.P.R. The new Princesses will be employed in the coast service out of Vancouver and will be capable of carrying twice as many passengers as the present boats. The orders for the immediate construction of these vessels were placed by Capt. J. W. Troupe, after consulting with Sir Thomas Shaughnessy, prior to sailing from the Old Country for Canada. The ships are to be in operation by 1915, in order to handle a big share of the passenger trade that will result from the opening of the Panama Pacific Exposition at San Francisco. The vessels will be about 400 feet long.

New Vessels Docking.

Prominent shipmasters, familiar with the navigation of the Inner Harbor, Victoria, expressed the opinion that it would be practically impossible to bring vessels of such length into the C.P.R. docks at James Bay, and as a consequence, there is widespread speculation as to what may be the plans of the company in respect to the docking of the new ships. It is known that the Princess Charlotte, which is shorter than the new Princesses now building, has long been regarded by shipping men as the limit in size for safe navigation in the Inner Harbor, and it is held to be practically certain that the company will dock the new ships either at the Outer Harbor, or at new slips to be built at some point in the neighborhood of West Bay. It is interesting to recall in this connection, that, during the visit to Victoria last year of Louis Coste, Chief Engineer of the Public Works Department at Ottawa, when he made an exhaustive inquiry into the problem of harbor development and selected the site of the breakwater, he expressed the opinion that West Bay could be utilized with great advantage to accommodate shipping.

The matter of where the new Princesses are to dock is held to be of the greatest importance, as in the event of new wharves being utilized by the C.P.R. this would imply the creation of a new commercial area in some part of the city not as yet developed along these lines.



PORT IMPROVEMENTS AT VICTORIA.

THE coastwise and foreign trade of Victoria, B.C., says the Pacific Marine Review, has so materially advanced during the past three years that the Dominion Government has taken decisive steps in the improvement of its harbor, which is destined to be one of the most important on the coast. In 1909, 2,401 vessels employed in the coasting trade arrived at Victoria, and 2,392 departed; in 1910, 2,636 vessels arrived, and 2,635 departed; in 1911, 3,103 coasting vessels arrived, and 3,123 departed, and in 1912, 3,457 arrived and 3,487 departed. Vessels engaged in the foreign trade have also increased during the past few years. In 1909, 903 foreign-going vessels arrived, and 575 departed; in 1910, 777 vessels arrived, and 513 departed; in 1911, 795 vessels arrived, and 415 departed, and in 1912, 1,076 vessels arrived, and 478 departed.

Outer Harbor Breakwater.

The first appropriation for the breakwater, which is to be built by the Dominion Government in connection with the piers and improvements at the Outer Harbor, will amount to \$1,500,000. The piers to be built in connection with the breakwater will cost, with their warehouses, \$1,800,000. There will be four warehouses of 1,000 feet in length on each pier, and the appliances for handling freight will be of the most modern type. The area of the Outer Harbor when thus completed will be 300 acres, and the minimum depth at low tide will be thirty-five feet.

The breakwater is to be 2,500 feet in length, and will serve as a protection to the entrance of the Inner Harbor, as well as to the piers to be built and the

Rithet piers already in use, thereby materially benefiting the great number of coasting vessels entering and departing from the Inner Harbor.

Drydock Location.

The drydock contemplated by the Dominion Government is to be located at Esquimalt Harbor, which is just adjacent to Victoria. A graving dock is already established at Esquimalt Harbor, this dock being 450 feet in length level with keel blocks, and 480 feet at gate on outer curve. The new dock is to be 1,150 feet in length, 110 feet at the gates, and having 35 feet of water over the sill. Accommodation can thus be provided for any ship now afloat. It is estimated that this dock will cost in the neighborhood of \$5,000,000.

Shipbuilding, which is now being carried on with success at Esquimalt, will undoubtedly be stimulated by the construction of this drydock. The new steamer for the Canadian Pacific Railway Co., the "Princess Maquinna," a thoroughly up-to-date coasting vessel, is now building by the British Columbia Marine Railway Co., Esquimalt. The C. P. R. have also just let a contract for the construction of two steamers of 5,000 tons for the British Columbia coasting service, which has so wonderfully developed of late years. The Grand Trunk Pacific Railway Co. have also found it necessary to establish docks and steamship connections at Victoria.

The opening of the Panama Canal should find Victoria in an enviable position for handling a large ocean and sea-going trade. The commencement of the bridging of the Seymour Narrows, connecting Victoria by straight rail with all of Canada and North America, it is believed, will not be long delayed after the completion of the canal. Middle Canadian wheat must find a Pacific outlet, and while there is no reason to believe that other ports on the Pacific Coast will not ship a certain portion of this, it is believed by shrewd observers that Victoria will be in a position to handle a very large bulk. All wheat-laden cars emptied into British

bottoms at Victoria can be reloaded with lumber, the staple which the Prairie Provinces cannot grow and must have, and no car will be returned empty.

S.S. "GLACE BAY" INSURANCE.

A CONTEMPORARY, says Syren & Shipping, has drawn attention to the case of the s.s. "Glacé Bay," which is ashore in Trepassey Bay, Newfoundland, and refers to the difficulty in connection with the arrangement made by underwriters with Merritt's Salvage Co., of New York, to endeavor to get her off, because of the Newfoundland Government demanding a 35 per cent. duty on the materials necessary to be imported for the work. The Newfoundland authorities are quite within their rights, as they are acting on the tariff law. The Premier of the Colony may perhaps make an exception in this case, but it might create a dangerous precedent. If this exception is made, what position will the local salvage firms stand in? They would always be liable to see work go past them to New York, which would, of course, spoil their tariff system and practically close their trade.

It appears to us that underwriters know full well the risks they take when they write their lines, and if they have to pay more for salvage services, they must make the best of it. In this case, it appears from the latest reports, that there is little chance of saving the steamer. So far as our recollection goes, there has only been one vessel which has got off when ashore at this spot in Newfoundland, and that was the "Wilhelmina," which was floated under very exceptional circumstances. She had a cargo of timber which proved her salvation. While she was ashore a strong southerly wind set in, and caused the tide to run higher than usual, which enabled the vessel, although her bottom was badly damaged, literally to float off on her cargo. We understand that the "Glacé Bay" has become a total wreck, and that salvage operations have, therefore been entirely abandoned.

NEW STEAMSHIP SERVICE INAUGURATED.

THE Border Line Transportation Co. has recently been incorporated under the laws of the State of Washington to engage in a general business between Puget Sound and British Columbia points. At present the line owns and operates the American S.S. "Fulton" and has under charter the British S.S. "Leona," giving a service every three days. It is the intention of this company to purchase or build another suitable American boat to be operated with the S.S. "Fulton."

The Border Line Transportation Co. will be operated by Dodwell & Co., Ltd., as agents, and the vessels will not only act as feeders and distributors for ocean vessels, but will also handle the output of the Powell River Co., Ltd., located at Powell River, B.C., which company is at the present time manufacturing 150 tons of paper per day.

CANADIAN VICKERS, LTD.

OUR illustration shows the Richelieu & Ontario Navigation Co., steamer "Montreal" aboard the floating dry-dock, "Duke of Connaught" at the plant of the Canadian Vickers, Ltd., Montreal. In view of the many conflicting statements concerning the utility and commercial aspect of such an equipment at the metropolis on the St. Lawrence, we believe the accompanying official information concerning the docking of the S.S. "Montreal" will be quite timely.

The "Montreal" was docked high and dry in the space of 4 hours from the time the vessel arrived at the dock entrance, and this time will undoubtedly shorten when the local laborers have become experienced in the operation. The whole work of docking, cleaning, scraping and painting the ship was done in 2½ days from the arrival of the vessel at the dock entrance, and needless to say, all shipping men will agree that this compares extremely favorably with similar operations in any part of the world. It should also be noted that this first case of docking is, in itself, a striking example of the advantages which the port of Montreal now has there being no other dock within hundreds of miles capable of so dealing with this particular ship.

ARMING THE "LUSITANIA."

THE reason why the crack liner Lusitania has been so long delayed at Liverpool, cables the correspondent of the New York Tribune, was announced to have been because her turbine engines were being completely replaced, but the Cunard officials now acknowledge that the greyhound is being equipped with high power naval guns in conformity with England's new policy of arming passenger boats. When the great ship, the third selected by the Government for armament, next appears in New York, about the end of August, she will be the first British merchantman for more than a century sailing up the lower bay with black guns bristling over her sides.

The Lusitania, which will be an invaluable addition to England's merchant fleet, because not only is she so fast, but of such great capacity for

carrying troops, was originally built with her decks adapted for armament, and the task of installing guns will be comparatively easy.

Arm Mauretania, Too.

It is very probable that, immediately the tourist season is ended, the Mauretania will be called to Liverpool, overhauled and equipped with guns. The British Government is hastening the task of creating an armed fleet under the red ensign. The mail boat running to South America now carries guns, and a few days ago the Aberdeen liner, Themistocles sailed from the Thames bound for Australia equipped also with the newest type of guns.

DOCKYARDS ON PRINCE EDWARD ISLAND.

IT is reported that the Dominion Government is taking immediate steps to construct a marine yard on the Atlantic seaboard, which in size and capacity will enable it to turn out smaller class cruisers and other type of war vessels, transports, as well as all classes of vessels required in the Government service. The new shipyard will be constructed and operated by the Government, and its location is to be at Charlottetown, P.E.I. It will be the first definite step to carry out Premier Borden's policy of building up a great shipbuilding industry in Canada.

The whole question of shipbuilding in the Dominion is now receiving the most careful consideration of the Government, and it is likely that a Royal Commission composed of experts will be appointed to inquire closely into everything associated with and pertaining to the matter.

It is hoped to have the yard completed and ready to receive construction orders in less than four years. Situated on the Atlantic seaboard, practically in the path of all vessels plying between Great Britain and the Dominion, in a splendid natural harbor, and of easy access to the steel works of Nova Scotia, the new yard will undoubtedly prove a successful enterprise.

IMPERATOR'S MAIDEN TRIP.

THE steamship Emperor, biggest ship afloat, bathed her keel in the Hudson River, New York, for the first time on June 19. With pennants fluttering from bow to stern, her bands playing lively airs, and river traffic bellying a hoarse salute, the new giant of the seas was warped into her pier at Hoboken by a fleet of tugs. Thousands of persons saw her stately journey from quarantine to her dock.

CAUSES OF OVERHEATING IN STEAM BOILERS.

THE following article is selected from the "Memorandum on Steam Boilers" prepared some time ago by Mr. William Buchan, one of H.M. Inspectors of Factories, and will be found of considerable practical interest to all engaged in steam power plant work, irrespective of relation thereto:

Scale and Sediment.

Feed water often contains solid matter in solution or suspension. As evaporation proceeds, solid matter in solution is deposited as a fine precipitate which under certain conditions forms a hard scale or crust. Sea water acts in the same way, leaving a deposit of salt. If the feed water is sedimentary, i.e., contains solids in suspension, there will be a deposit of mud within the boiler. It is most important to prevent any accumulation, and the remedies may be classified as follows:—

(1)—Substitution of a pure water supply. (2)—Treatment at the boiler.

(3)—Removal of all scale-forming constituents from the feed water before it enters the boiler. The first remedy, although effectual, is not always practicable, and the second class covers such methods as (a) the systematic cleaning of the boiler and removal of scale; (b) blowing off regularly when the boiler is at work to carry away the

deposit and keep the density below $2\frac{1}{2}$ 32,

and (c) the addition of a suitable solvent which prevents the deposit forming a hard incrustation. Before using any boiler composition, it is expedient to have the water analysed, and to settle the routine under expert advice, as a composition suitable with one kind of feed water may be useless with another, and it should be remembered that the use of such composition does not remove the necessity for systematic cleaning.

A definite interval cannot be fixed for cleaning and scaling boilers as so much depends on circumstances. For each boiler this interval should be fixed by experience, and the best guide is probably the thickness of deposit, which should not be allowed to exceed a sixteenth of an inch on the main heat-absorbing surfaces; particular attention should consequently be given to the removal of scale from parts exposed to high temperatures, for instance, furnace and firebox crowns and tubes of multitubular and water-tube boilers. These tubes can be kept clean by the use of brushes or tube scrapers of various types, and if the deposit is hard, turbine cleaners can be applied. The

latter are operated by water, steam, or compressed air, supplied by a hose, and the rapid succession of blows by the vibrator or milled cutter knocks the scale from the tubes, leaving them practically clean. As nearly all the explosions of water-tube boilers occur at the tubes it is most important that they be kept clean.

Overheating Through Grease.

When exhaust steam is passed into the feed water to heat it, or the oily water of condensation from a condensing engine is used as feed water, grease will be present in the boiler, and as it becomes concentrated on the surface of the flues or tubes, will not only reduce the efficiency of the boiler, but be a positive source of danger, as it may lead to serious overheating and subsequent collapse of furnace crowns or tubes. A film of grease one-hundredth of an inch thick offers resistance to the passage of heat equal to a steel plate ten inches thick. In other words, grease offers a thousand times the resistance of steel to the passage of heat.

If it were only realized that the apparently harmless film of oil offered as much resistance to the passage of heat as a thick deposit of hard scale, more care would be taken to eliminate it. When oil is present in the feed water, much of it exists in an emulsified condition, i.e., in the form of minute suspended globules. The principal methods now in use for the removal of grease are:

Filtration of feed water. Whether gravitation or pressure filters are used, the feed water passes through some filtering medium, such as canvas or sand. In land boilers this system is not advisable, as a rule, except as an auxiliary to other methods, as the filters only remove the bulk of the oil, but not the finest particles of it.

Separation of grease from the exhaust steam before the steam enters the condenser or heater. A grease separator consists of a metal chamber with a number of baffle plates inside. Owing to the large volume of the separator, and the presence of the baffle plates, the velocity of the exhaust steam is reduced and consequently the bulk of the oil is thrown down. This method gives better results with non-condensing engines than with condensing engines, results being often unsatisfactory with the latter, because of the great velocity of the steam as it passes through the separator.

Chemical treatment of the greasy water and subsequent filtration.—The feed water is automatically treated with correct proportions of suitable reagents which collect the minute globules in a form suitable for removal by filters of wood fibre or sand.

Electrical treatment of the greasy water and subsequent filtration.—The water is allowed to collect in a vat; the passage of an electrical current through the water, by means of metal plates, causes the minute globules to coalesce, and in this form the oil can be efficiently removed by sand filters.

If it is desired to heat the feed water by exhaust steam from which the grease has not been removed, the steam should be conveyed in coils of pipes, and should not, upon any account, be brought into direct contact with the feed water. Where condensers are used, very satisfactory results can be obtained by combining a grease separator (placed between the engine and the condenser), with a good chemical or electrical method and subsequent filtration.



DESIGN AND ECONOMY OF DIESEL ENGINES.

A PAPER on "The Design and Economy of Diesel Engines" was read at a recent meeting of the Association of Engineers-in-Charge by Capt. H. Riall Sankey. The author compared the cost of running Diesel engines with other prime movers, and pointed out that the condensing steam engine can, for short periods, give as much as 50 per cent. above the rated power, while non-condensing steam engines and the Diesel engine can give 10 per cent., but the gas engine can usually only do its rated power for short periods, and about 85 per cent. continuously. Taking the case where an average load of 200 horse power, and a maximum of 300 horse power for short periods is required, and the total running hours 3,000 per year, the following total annual costs were given:—Non-condensing steam plant, \$7,225; condensing steam plant, \$5,280; oil engine, \$5,275; gas engine suction producer, \$5,030; gas engine pressure producer, \$4,980; Diesel engine, \$4,660; overtype superheated condensing plant, \$4,395. In this connection, interest on capital was taken at 5 per cent., and stores, labor, maintenance, repairs, and depreciation and fuel cost were taken into account. The costs per ton were taken as:—Oil, \$10.25; coal for pressure producers, \$4.50; coal for suction producers, \$6.80; coal for steam boilers, \$4.50. Only 120 tons of fuel are required for the Diesel engine, while 1022 tons are required for the non-condensing steam plant.



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H. V. TYRRELL, Toronto - Business Manager
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RECENT WRECK COMMISSION INQUIRIES.

WE have pleasure in recording our appreciation of the results of the efforts put forth on behalf of Captains Harrison and Hoy, of the steamships Royal George and Bengore Head respectively, with a view to quashing the judgments passed upon them by Canadian Wreck Commissions and which involved the suspension of their certificates. Both officers have had the sympathy of shipping men all over the world, our contemporary, the "Canadian Railway and Marine World," in its effort to raise a side issue, notwithstanding. We cannot do better than quote its views expressed in a recent editorial, because, for lack of point, and sublimity of ignorance, real or assumed, of what constitutes a misdemeanour under the circumstances, they cannot be surpassed.

After quoting the expression of opinion given concerning the Royal George decision, in a recent number of "The Journal of Commerce," our Canadian contemporary goes on to remark that their author "is either lamentably ignorant of the facts, and, therefore, incompetent to express an opinion, or else he is blinded by insular prejudice or some other cause. Further comment, it says, is reserved until the full text of the Board of Trade decision is received, but in the meantime, it may, however, be pointed out that representatives of that body, who probably have never seen the St. Lawrence, and know nothing about it, are hardly likely to be accepted, at least in Canada, as any better authorities than Canadian officials who thoroughly know the route."

Why this bother about the route, when the question was one of justice to the men, having regard to the circumstances? "Syren and Shipping" handles the matter without gloves, and shows the utter lack of appreciation

of the evidence offered, by the Commission which purported to hand out justice. We quote that journal as follows:

"For the second time, within the space of a few weeks, has the verdict of a Canadian Court of Inquiry been upset—in the one instance by the Board of Trade themselves, and in the other as a result of the victim's appeal to the Admiralty Division. Towards the end of April last, the Board returned the certificate of Capt. Harrison, late master of the Canadian Northern liner Royal George, thus administering a smart rebuke to the Court which had passed a sentence of twelve months' suspension on that mariner, while the Admiralty appeal was heard on May 24, and resulted in the restoration of the certificate of Capt. J. C. Hoy, of the Bengore Head.

There was a strong element of similarity about the two cases. In that of the Royal George, the real culprit was the pilot, and his license was suspended for a term of three years, but the Court, in its wisdom, blamed Capt. Harrison for not being on the bridge at the time, the idea of that tribunal apparently being that a shipmaster should be able to do without sleep altogether. In the case of the Bengore Head, it was the second officer who was responsible for the casualty, and his certificate was suspended for a period of nine months. This court, however, held similar views to those of the other, and, on finding that Capt. Hoy was below at the time of the stranding, suspended his ticket for the space of three months. In each instance the sentence was utterly uncalled for.

Capt. Harrison, although there was a pilot in charge of his vessel, had had only about six hours' sleep in nearly three and a half days; while Capt. Hoy, when he went below, had given full and proper instructions to the officer on watch; the subsequent trouble being due to the fact that the officer took it upon himself to alter the ship's course without informing the master.

It is satisfactory to know that the Courts which inflicted these outrageous sentences have been duly snubbed, but surely the matter ought not to end there. In Capt. Hoy's case, the sentence of suspension had run its full course, long before the appeal was heard, and thus the reversal of the Canadian Court's decision is simply a figure of speech. It is but poor consolation to a man, when he has paid the penalty for a fault which he never committed, to be told months afterwards that he was wrongfully convicted. Capt. Harrison, we believe, is even worse off. Of course, he lost his command, and, so far as we are aware, he has not been reinstated.

Surely there is something radically wrong when innocent men who have lost their employment through the stupidity of those appointed to sit in judgment upon them cannot obtain a penny in the way of compensation. Are they not as much entitled to be compensated as the drunken seaman who, after a debauch ashore, comes reeling back to his ship and lames himself in climbing aboard her? There is another point, too, which is worthy of consideration. It has been suggested by our daily contemporary, the Shipping Gazette, that when a bona fide appeal is entered against the sentence of a Court of Inquiry, the punishment should stand suspended. The idea is a thoroughly good one, more especially in its application to the decisions at inquiries held abroad. It frequently happens that the result of such investigations constitutes an utter travesty of justice, and it is deplorable that the sentence should come into operation before the unhappy victim has a chance to take his case before a saner and more impartial tribunal. Even a common criminal has a right to appeal nowadays before his term of punishment begins. Surely, then, the shipmaster or officer, whose only offence—if he has offended at all—is that he has failed to do his work properly, should enjoy at least an equal privilege."

MARINE NEWS FROM EVERY SOURCE

Vancouver, B.C.—A list of names of candidates for the proposed Harbor Commission of Vancouver has been forwarded to Ottawa.

Port Coquitlam, B.C.—The Coquitlam Shipbuilding and Marine Railway Co. will build a marine railway slip, costing \$30,000. L. D. Shafner is manager.

Port Coquitlam, B. C.—The Fraser River Navigation Co. will put on a freighter to make daily trips between this city and New Westminster, and will erect a wharf at Pitt River.

Liverpool, N.S.—An electrical storm struck Coffin's Island lighthouse and practically destroyed it on June 19. The lighthouse was 65 feet high, with a white revolving light visible sixteen miles.

Vancouver, B.C.—The Canadian Pacific's new liner Empress of Russia, Captain Beetham, sailed on June 19, on her first trip from Vancouver to the Orient. She takes out fifty-five saloon passengers and a number of Chinese.

Sault Ste. Marie, Ont.—The steamer Van Hise, which went aground on May 23 in the Straits, was released by the wrecker Favorite the following day. About 800 tons of her cargo of ore was jettisoned before her release was effected. The Van Hise was bound for Chicago.

Windsor, Ont.—The Detroit, Ojibway and Ecorse Ferry Co. started its ferry service between Ecorse and Sandwich on May 24. The 50-ft. launch, with a capacity of 60 passengers, was put on the run. A 100-ft. launch, now under construction, will be commissioned about July 1.

Vancouver, B. C.—The Northern Dredging Co. Ltd., capital \$250,000 has been incorporated at Victoria to do dredging work on the coast of the mainland, and Vancouver Island. They have one dredge of the dipper type, and are making arrangements for two others as soon as contracts are signed up. Their offices are in the North-West Trust Bldg. J. A. McDougall, is presi-

dent and general manager, and W. B. Brien, vice-pres, and treas.

Toronto, Ont.—The Richelieu and Ontario Navigation Co. have bought out the following five lines:—The Canadian Interlake Line, Limited, The Niagara Navigation Co., The Inland Lines, Ltd., The Ontario & Quebec Navigation Co., The Quebec Steamship Co.

Charlottetown, P.E.I.—The schooner Polar Star, which left Pictou, N.S., for Charlottetown on Tuesday, June 10, with 100 tons of coal, foundered off Point Prim the same night. Captain Cormier of Souris; Henri Bushey and Andrew MacDonald, of Charlottetown, members of the crew, were drowned.

Victoria, B.C.—The Canadian Pacific Railway has announced that the contract for the two new Princess steamships has been awarded to Denny and Brothers, of Dumbarton, Scotland. The cost of these steamships will be in the neighborhood of \$2,000,000. They will be completed by 1915.

Ottawa, Ont.—The Government will ratify and confirm an agreement with the Western Dry Dock and Shipbuilding Co., Ltd., respecting the construction of a dry dock at Port Arthur, Ont., paying the company a subsidy of 3 per cent. per annum for 20 years on the sum of \$1,250,000—the cost of constructing the dock.

Montreal, Que.—A contract for the construction of a large freighter was closed by the American Shipbuilding Co., with Canadian interests in this city, last week. The boat will be built in Port Arthur, and will be 625 feet over all, and will have a capacity of 450,000 bushels. She will be fitted with Scotch boilers and triple expansion engines.

National Steamship Co.—The National Steamship Co., Ltd., of Toronto, has been incorporated under Dominion letters patent. The incorporators are Cawthra Mulock, financier; Gordon Foxbar Perry, manufacturer; James Brown Foote, marine manager; Edmund Herbert Laschenger, financial agent, and Malcolm Stobel, broker, all of Toronto, and the company will have the general

power of a steamship and transport organization, its operations to be carried on throughout the Dominion. The company has a capital stock of two million dollars and its headquarters are at Toronto.

Car Ferry Record.—The car ferry Bessemer, plying between Conneaut, Ohio and Port Stanley, on Saturday, May 31, made her fifty-sixth trip across Lake Erie in the month of May, breaking her previous record of 52 trips. The boat brought to Canada 1,647 cars, or 73,182 tons, of freight during the month.

Sarnia, Ont.—The Thompson Tug Co. has purchased the steel tug Sport from the Cartier Holland Lumber Co., of Leamington, and the boat arrived in the river on June 20. She is about sixty feet in length and will be used for harbor work. She was formerly used to tow logs and rafts.

Sault Ste. Marie, Ont.—All boats bound either way through the American Canal have to pass through the north side of the draw of the C.P.R. bridge above the locks, on account of a contractor's outfit working at the south pier. The last portion of the old wooden pier is being replaced with concrete.

Port Arthur, Ont.—The floating of Noronic makes the third large ship launched from the Western Dry Dock and shipbuilding yard in six months, involving an expenditure of well over one million dollars, and shows the vast developments that have taken place in Canadian shipping since the establishment of this plant at Port Arthur.

Fort William, Ont.—Under the new regulations which will be put into effect at the city docks, all steamers at the wharf must be prepared to move when so required by the dock master, and vesselmen will not be permitted to leave freight on the dock for more than five hours. The loading or unloading of sand, gravel and cement will be permitted. Small craft, including gasoline boats, will dock at the lower end of the wharf, and the steamers at the upper end. R. McNab was appointed wharf master at a salary of \$75 a month.

New Welland Canal.—Tenders have been called for the first three miles of the new Welland Canal, starting from the Lake Ontario end. The tenders will be opened on July 17th, and it is expected to have work begun by August. The total cost of the new canal is estimated at \$55,000,000.

Wages Increase.—The Allan Line have granted an advance of five shillings a month to seamen and firemen employed on the Grampian and Hesperian, since those vessels have been engaged in carrying mails between Glasgow and the St. Lawrence. The advance is in accordance with the custom of mail service vessels, which pay higher rates than others.

Port McNicoll, Ont.—The passenger steamer John Lee has been purchased from the Penetang Steamboat Co. by Port McNicoll parties, and will be operated this season out of Port McNicoll and Midland, meeting the C. P. R. fast trains and giving a daily service between Port McNicoll and Georgian Bay tourist resorts.

Ottawa, Ont.—The Department of Marine and Fisheries is about to call tenders for the steamer Scout. The vessel is to be used in the lighthouse service between Montreal and the Welland Canal, and is to be 155 feet long, 30 feet wide and 13 feet deep. It will be stipulated that the vessel must be built in Canada.

Quebec.—The British steamer Wabana, Captain Reside, ran ashore below Matane, while on the passage from Sydney to Montreal, and was placed in the dock here. She has a bad dent, extending nearly the entire length of her starboard side, and a shorter one on the port side. The Wabana would have to be in dry dock for about four weeks.

Brockville, Ont.—The Donnelly Salvage and Wrecking Co. were successful in pumping out and pulling off the lake tug Florence, owned by the Quebec Transportation Co., which ran ashore, capsized and filled with water at the head of the channel near Farran's Point. Inspection showed that she had not been injured, and she left for Montreal.

Toronto, Ont.—The freight steamer Doric, of the Richelieu and Ontario Navigation Co., Inland Lines division, damaged several of her bow plates on May 26, when she grazed a submerged rock near the entrance of Depot Harbor, in the Georgian Bay. The boat's forepeak rapidly filled with water, but the captain succeeded with some difficulty in working her to Collingwood, where she was placed in dry dock.

Vessels Chartered.—The Nova Scotia Steel & Coal Co. has secured a ten-years' charter of the new steamers Wagama and Wascama, recently built on the Tyne. Each of these steamers carries 8,000 tons dead weight, and will be operated between Wabana, Newfoundland, and North Sydney, and between North Sydney and Montreal, in the coal and ore trades.

Montreal, Que.—An accident to the well known C.P.R. tug, Cruiser was reported recently. The Cruiser was driven by strong winds on to the rocks in St. Catherine's Bay, at the entrance of the Saguenay River, and her bows were badly damaged in consequence. The wrecking tug, Lord Stratheona, towed the Cruiser from St. Catherine's Bay to Quebec, where she will be repaired.

Montreal, Que.—Not in years has the port of Montreal been so filled with ocean steamers as at the present time. The great rush of wheat from the upper lakes since the opening of navigation has filled the harbor with a fleet of tramp vessels. Recently, at Windmill Point, there were eight big carriers loading or waiting for a chance to get off. In addition, there were two Standard Oil ships, together with a bunch of coal carriers. Everywhere in the port there is great congestion of space.

Montreal, Que.—With ten thousand barrels of oil in her tanks, the Standard Oil Company steamer 'No. 84, arrived here a few days ago. The ship is on her maiden trip, having been built last winter in Cleveland. She is the full canal size, in fact she had to do some wiggling and twisting to squeeze through the locks. She is one of the finest tank steamers seen in the port in a long time, and is said to be the last word in such equipment in every respect. After coaling, she will run back for another load of the same class. Three or four more oil carriers are due here soon.

St. Catharines, Ont.—A serious accident on the Welland Canal occurred at Port Dalhousie about five o'clock Sunday morning, June 15, when the four gates of Lock 1 were carried away, and navigation delayed. The steamer Neepawah, bound up for Port Colborne, had just passed through Lock 1 and was proceeding towards the next lock when the wooden steamer Lloyd Porter, towing two barges, commanded by Captain Hefferman, and owned by Hepburn Bros., of Picton, approached the lower gates of Lock 1. She was traveling at a good speed, and the captain gave the signal to reverse, but the engineer misunderstood the signal, and instead of reversing, put on full speed ahead, sending the steamer crashing into the gates of Lock 1.

Vancouver, B.C.—The new C.P.R. Trans-Pacific liner Empress of Russia, Captain Beetham, R.N.R., tied up at Pier B., Saturday afternoon, June 7, being the largest vessel ever berthed in the port of Vancouver. She clipped from twelve to thirteen hours off the Trans-Pacific record. The Empress carried several hundred passengers, who had been aboard since leaving Liverpool and who had taken advantage of her maiden voyage around the world.

Charles H. Cramp, former head of the shipbuilding firm of William Cramp & Sons, of Philadelphia, died on June 6, at Philadelphia, after a lingering illness. Mr. Cramp, who was 85 years old on May 9, had been in feeble health for some time, and about a month ago began to grow weaker and sank gradually. He was born in Philadelphia, May 9, 1828, being son of a shipbuilder, William Cramp, who founded on the Delaware river in 1830, the plant that has become one of the prominent shipbuilding companies in the world.

Vancouver.—Captain Hansen, of the Danish steamer Kina, recently brought word that the owners, the East Asiatic Co., have ordered four motor-driven vessels for the Vancouver trade. It will be remembered that the East Asiatic Co. was the first concern to recognize the use of the Diesel motor for off-shore trade. The success of their first motor vessel, the Selandia, brought shipowners to a realization of the importance of the motor-driven craft. Captain Hansen has been requested to send home to Copenhagen particulars of dock accommodation in Vancouver. The first vessel was recently launched, and will go to Vancouver via the Orient.

Change of Rules.—Changes in rules of the road, in order to promote harmony between the United States and Canada in respect to lake navigation, were considered in Ottawa on June 18, at a conference between Capt. King, of Toronto, chief examiner of masters and mates for Ontario; Capt. Coles, of Collingwood, examiner at that port, and officers of the Marine Department. The difference between American and Canadian rules has not infrequently been the cause of collisions or mishaps on the lakes, and consequently a change is proposed. The alterations, however, will be a purely technical character.

Clyde Shipbuilding.—The shipbuilding output on the Clyde during the month of May totalled 56,000 tons, spread over 31 vessels, as compared with 53,500 tons in the corresponding month of last year. The total for the five months of the year shows an increase of nearly 40,000 tons over that of the cor-

responding period of 1912. The yards are still busy, but very few new contracts are being placed. This latter circumstance is attributed partly to the increasing cost of production, and also to the difficulty of guaranteeing delivery in view of the strike which was threatened.

Halifax, N.S.—A wire was received on board H.M.C.S. Niobe from Ottawa on June 14, announcing that the pensioners and reserve men are to go home to England early in July. Commander Macdonald sailed for the Old Country on Wednesday, June 18, and the other officers will follow within a few weeks. A handful of men, it is understood, will be retained on board the Niobe as caretakers, and the ship will be tied up at one of the dockyard piers.

Windsor, Ont.—In a cruise down through Livingstone Channel in the lower Detroit River, Lieut.-Col. Patrick, United States District Engineer; Wm. Livingstone, President of the Lake Carriers' Association, and others associated with marine interests, investigated a number of conditions concerning which vessel masters have voiced criticism. Following the trip, the announcement was made that the Lake Carriers' Association will place the tug Pittsburg on patrol duty along the channel at night until some arrangements can be made for a Government patrol boat. The Pittsburg, among other duties, will see that lights are kept burning by placing lanterns to mark any which become extinguished. A stake light will be established on the west bank of Livingstone Channel about midway between the lightship and gas buoy No. 29, which marks the turning point, and is opposite Canadian buoy No. 79, and shows a green and white light. The light shown from the stake will be white.

Charles B. Connell, head of the firm of Charles Connell & Co., Scotstoun, on the Clyde, who died recently in Glasgow, was one of the most popular men in British shipbuilding. The undertaking in the management of which he succeeded his father was never a producer of liners, nor did it make the propelling machinery for the vessels which it built; but for 20 or 30 years it has been in the forefront of British cargo-boat yards, expanding in area and productive capacity as steamers of the type increased in size. He was about sixty years of age and had been ill for some time. If our memory serves us truly, his firm built, in 1883, two of the three vessels, the "Algoma," "Alberta," and "Athabasca," for the Canadian Lakes service. These ships were constructed so that they passed through our eastern canals in two lengths.

Royal George at Sea Again.—The C. N. R. liner Royal George sailed from Bristol for Montreal, June 17, for the first time since she stranded on the Isle of Orleans late last fall. After the accident, the company despaired of ever floating the ship again, but some excellent salvage work was accomplished, with the result that the George was finally refloated and towed into Quebec, where she was patched up sufficiently to allow of her proceeding to Halifax, where repairs of a more durable, though still of only a temporary nature, were effected. When these were completed, Captain Thompson, the marine superintendent of the line, took the ship to the other side, where she was thoroughly overhauled at the Tranmere yards of Cammell, Laird & Co., at Birkenhead. Recently, the Royal George made a most satisfactory trip, through a roughish sea, from Birkenhead to Avonmouth. Captain Thompson is in command, and the liner has a very satisfactory passenger list, by way of celebrating the happy occasion.

Sarnia, Ont.—The new oil tank steamer "Imperoil," which has been added to the fleet of the Imperial Oil Co., and which formerly plied on the ocean, arrived at Sarnia on June 13, with a full cargo of crude oil which she loaded at Cleveland on the way up. The boat hails from Old London, and is one of the strongest built crafts sailing on the lakes. She has hardly any fancy work, being built for great carrying capacity. The machinery and equipment are, however, thoroughly up-to-date. The boat is considerably larger than the last new comer, the "Locoma," and will be used to carry crude oil from Cleveland to Sarnia, and refined oil from here to Fort William.

S. S. "Impoco."—The Greenock and Grangemouth Dockyard Co., Limited, launched on May 20, the steel screw steamer "Impoco," built to the order of the Imperial Oil Co., Ltd., of Sarnia, Ontario. Her dimensions are:—Length, b.p., 230 ft.; breadth, 43 ft.; depth, moulded, 21 ft. She is classed 100 A1 at Lloyd's, and has been built for the carriage of petroleum in bulk on the Canadian lakes, having been designed for passage through the Welland Canal. She will carry a total deadweight of about 3,000 tons on 18 ft. draught. She will have triple-expansion engines, taking steam from two large boilers.

Montreal, Que.—The new service between Italy and Canada will start early in July, under the auspices of the Navigazione Generale Italiana and Italia lines, which are subsidiaries of the

Hamburg-American line. It was at first thought that the Sannio would be one of the boats employed on the route, but it has now been decided to commission the Napoli and the Lazio, each of which is about 9,200 tons gross register, and of a speed of about 14 knots. One boat will run to Quebec and Montreal, and the other to Halifax and Boston, the sailings being from Genoa, Naples and Palermo.



S.S. "JAMES CARRUTHERS."

IN the descriptive article on the steamship "James Carruthers," which appeared in our May number, we should have stated that the interior of the double bottoms and side tanks were coated with Briggs' Anti-corrosive Bituminous Solution, and not with Anti-fouling compound. It may be of interest for our readers to know that Briggs' bituminous coatings were, for the most part, applied to the Hamburg-American Co. Steamship "Imperator," and are on order for the two vessels now under construction by them.



CANADA'S WRECK COMMISSION SCORED.

BBRITISH and American shipping journals, almost without exception, unite in condemning the Canadian Wreck Commission Court in the Eastern Provinces for its decisions with regard to captain's certificates in case of accident to the ships they command, and allege that many of the decisions given are unjust, and that their injustice has been inspired by the Dominion Government, with the object of casting blame on the commanders, in order to conceal the dangers which are stated to be incidental to the British North American trade.

Commenting on the decisions arrived at in the cases of the Royal George and Bengore Head, the London Shipping Gazette says: "In the case of the Royal George we have an experienced master thrown out of his command first, and exonerated afterwards. In the case of the Bengore Head, we have a master who serves his punishment first and is honorably acquitted afterwards. If this is justice, what in heaven's name is injustice?"

Syren and Shipping maintains that it is folly to censure a master because he happened to be below when an accident occurred. Captains, it points out, are merely human, and must sleep at times.

MARINE ENGINEERING OF CANADA

KING'S BIRTHDAY HONORS.

HONORS bestowed on the occasion of the recent birthday of our King, will be appreciated no less by the shipbuilding, shipping and marine engineering fraternity than by the gentlemen on whom they have been conferred. Dr. Archibald Denny and Mr. Stephen Furness have been made Baronets, and Professor J. H. Biles has been made a Knight. Sir Archibald Denny, Bart, is a partner in the world-known shipbuilding and marine engineering firms of William Denny Bros. and Denny & Co., respectively, of Dumbarton, Scotland. He holds a high reputation as a naval architect, and has acted on several occasions as Chairman of Royal Commissions appointed to investigate questions pertaining to naval architecture and marine engineering. As a contemporary expresses it, "His Majesty will probably be esteemed to have distinguished the whole of the world's premier shipbuilding river, by so honoring Dr. Denny."

R. & O. MERGER PLANS.

THE board of directors of the Richelieu and Ontario Navigation Co., at a special meeting held on June 10, unanimously ratified the plans which have been under way for some time, calling for the organization of a new company to take over the Richelieu and Ontario and some ten other steamship lines operating on the upper Canadian Lakes and the St. Lawrence River route. The board appointed a committee consisting of the president, James Carruthers; the vice-president and managing director, James Playfair; the chairman of the finance committee, Sir H. Montagu Allan, and the chairman of the executive committee, J. R. Binning, and Messrs Edmund Bristol, K. C., M.P.; C. A. Barnard, K.C. and W. Grant Morden, to carry out the detailed arrangements, a full detailed announcement of which will be made in due course.

Objects of the Consolidation.

The main objects of the consolidation were, it was explained, to round out the entire organization of the package freight and passenger business right through from Montreal to the head of the Lakes at Port Arthur and Fort William, and the purchase of the Quebec Steamship Co., it was shown, would provide the company with a through passenger service on the entire St. Lawrence route from Montreal to Picton, and thence to New York. The company would also have a through line from New York to Bermuda and the West Indies. This would result in an all-British organization, with direct steamship con-

nections between all British possessions on this side of the Atlantic.

The Assets.

The statement of the Canadian Appraisal Co. as to the valuation of the new company was placed before the directors as follows:

Vessels	\$16,875,034.00
Real estate, buildings & dock properties	5,450,267.99
Lease and contracts, goodwill, etc.	8,791,935.67
Bond investments	139,232.37
Stores and supplies on hand	161,623.62
Cash in bank and on hand	130,873.28
Notes and accounts receivable	845,545.74
Unexpired insurance	98,802.66
Deferred charges on operations	31,294.59
Cash paid on account new steamers	60,078.95
	<hr/>
	\$32,584,688.87

Liabilities.

5 per cent. 30-year debentures	\$ 7,500,000.00
125,000, 7 per cent. preference shares at \$100 each	12,500,000.00
120,000 ordinary shares at \$100 each	12,000,000.00
Current accounts payable	584,688.87
	<hr/>
	\$32,584,688.87

Estimated Earnings.

The statement of net earnings of the companies for the past three years were:

1910	\$ 885,545.39
1911	1,153,909.62
1912	1,503,948.67

Allowing for new tonnage, not in operation before this year, the increase in earnings over 1912, it was estimated, would amount to \$263,000. It was said, too, that the saving in executive expenses under central management would be \$150,000, which would make the 1913 net profits \$1,916,948.67. This would leave 7 per cent. on the preferred stock, 5 per cent. on the debenture stock, and 5½ per cent. on the common stock.

The new company will have an authorized capital of \$25,000,000, divided into \$12,500,000, 7 per cent. preference cumulative stock, and \$12,500,000 ordinary stock. There will also be \$7,500,000 of 5 per cent., 30-year first mortgage debenture stock.

Companies Acquired.

The following companies have been acquired:—Richelieu & Ontario Navigation Co.; Inland Lines, Ltd.; Northern Navigation Co., Ltd.; Niagara Navigation Co., Ltd.; St. Lawrence River Steamboat Co., Ltd.; Richelieu & On-

tario Navigation Co., of U.S.A.; Quebec Steamship Co., Ltd.; Canada Interlake Line, Ltd.; Ontario and Quebec Navigation Co., Ltd.; Merchants Montreal Line; S.S. Heddington; and Thousand Island Steamboat Co., Ltd.

CAR BARGE FOR C.P.R.

THE Polson Iron Works, Ltd., Toronto, are building to the order of the C.P.R., for service at Nelson, B.C., a 3 track car barge, with capacity of 15 loaded cars, and of the following dimensions: Length, 224 ft.; beam, 42 ft. 6 in.; and depth, 8 ft. The barge will be erected at the builder's yard, being afterwards "knocked down" and shipped to Nelson, where it will be re-erected, completed, launched and put into commission. Watertight bulkheads of ample strength for the particular service, 7-in. shipbuilding channel frames, 7-16-inch shear and keel strake plates, and ¾-inch hull and deck plating constitute a few of the constructional details. The contract price was in the vicinity of \$80,000.

WELLAND CANAL ACCIDENT.

AN accident unprecedented in the history of the Welland Canal, occurred at five o'clock in the morning of June 15, when the four gates at Lock (1) were carried away by a small steamer bumping against the foot gates, while the lock was full of water. As a result, navigation was tied up.

The steamer Neepawah had left lock (1) at Port Dalhousie bound up. The upper gates had not been closed, and only the foot-gates separated the level of water from the harbor and Lake Ontario. The little wooden steamer Lloyd Porter, owned by Hepburn, of Picton, which had towed two barges into the harbor, approached the lock with too much speed on, and the captain discovering the gates closed, and that his boat was travelling too fast, signalled the engineer to stop and reverse, but the engineer's interpretation of the signals was to the contrary, and he gave the boat further speed ahead, striking the gates, unmiter them, and allowing a few inches of water through.

Once started, the pressure of water wrenched both gates from their fastenings, and tossed them into the harbor, the open upper gates soon following. The Neepawah had not reached lock (2), but danger whistles from below and receding water proved sufficient warning to the mate, who succeeded in making the lock before the water had run too low. The gates were then shut, and sufficient water to float the Neepawah was obtainable from the level above.

PORT NELSON.

FOLLOWING the decision of the Hon. Frank Cochrane, Canadian Minister of Railways and Canals, that Port Nelson, on the south-westerly shore of Hudson's Bay, near York Roads, is to be the tidewater terminus of the Hudson Bay Railway, work upon the \$25,000,000 project will be resumed this season, so soon as the ice and snow have passed. The railway is designed to bring the vast grain areas of the Canadian North-West within a hauling distance of Liverpool of 3,500 miles, or about 1,800 miles less than the existing rail-and-lake routes through the ports of Montreal, St. John, N.B., and New York. Of the total length of 410 miles from Le Pas, a Canadian Northern Railway station on the Manitoba-Saskatchewan border, to Port Nelson, 75 miles already have been laid with track-
age and a bridge spanning the Saskatchewan River is all but completed.

Objection to Panama Route.

An objection to the Panama route for grain shipments exported through Prince Rupert and Vancouver is cited by J. B. Hunter, Deputy-Minister of Public Works, in the annual report of that Ministry, who avers that "in the warm, humid climate (of Panama) there is danger of grain heating." It therefore becomes apparent that the Hudson Bay route will enter sharply into competition with the Panama Canal. In an article in the May issue of the National Waterways Magazine, by the National Rivers and Harbors Congress, Harry Chapin Plummer pays a tribute to the foresight and courage of the present administration of the Dominion in advancing to a state of early realization the magnificent undertaking, which he likens to "some epic stroke of daring by heroes of Norse or Nibelung mythology."

The writer observes that, unlike railways operating in more temperate latitudes the Hudson Bay Railway can be worked to its capacity for only two months in the year, and to a lessening extent for little more than another month, but that during this interval, the volume and importance of its dependable traffic dictate that it be literally overworked.

He quotes the chief engineer of the Hudson Bay Railway, John Armstrong, as pointing to the markedly increased difficulty a hostile fleet would have in attempting to blockade the Atlantic coast of Canada when the Hudson's Bay route is opened, due to the fact that ships can enter and leave Port Nelson all the year round.

"The likelihood of Port Nelson becoming an objective strategic point in

the calculations of land or naval forces invading the Dominion occurs as not altogether a supposition," he observes, "when the picturesquely dramatic events of the long period of warfare between the English and the French, which was terminated by the Treaty of Utrecht, in 1713, are reviewed. The old Fort Nelson or Fort Bourbon as it was alternately called by its British and Gallic besiegers, became the scene of repeated conflicts, and the stubbornness of the resistance offered on each occasion of attack, and the decisiveness which marked its fall, proves how important a stronghold it was regarded."

Optimistic View of the Scheme.

An optimistic view is taken as to the probable effect of the development of the railway and steamship route upon the Hudson's Bay country, and the mineral wealth of the region is pointed to as promising the future exploitation of marble, iron, mica and limestone, especially in the territories known, until recently, as Ungava and the North-West Territory, but now included within the provinces of Quebec and Saskatchewan, respectively.

"A glance at the geological formation of the cliffs on both sides of Hudson Strait and the rocky highlands suffices to promise that, as the waterway comes to be frequented as a route of navigation, mining and quarrying industries will result in extending the zone of operations of tramp steamers in the North Atlantic trade to the Strait proper. . . .

"Bedded iron ore, similar to the iron-bearing rocks of Lake Superior, and credited as being of the same age as those famous deposits, have been the subject of investigation and analysis by corporate interests of the Dominion for several years past all along the eastern shore of Hudson's Bay, and marble of an exceedingly high grade is quarried on Marble Island, off the western shore of the bay on the mainland, near Fort Churchill.

"It is in the well-nigh inexhaustible motive power provided by the streams and waterways that the country to be crossed by the railway has its fundamental asset for future industrial exploitation. An approximate estimate of the discharge of the Nelson River alone gives indication of 156,869 cubic feet per second."



The Volt Electric Co., incorporated at Toronto, to manufacture, electrical appliances at Toronto, with capital of \$40,000; incorporators, Daniel F. Pierce, James J. Kenney, John E. Anderson, Leopold Macauley, all of Toronto.

SOLID INJECTION FOR DIESEL ENGINES.

THE problem of injecting fuel without an air blast is one which has for some time past been occupying the minds of a large number of Diesel engine makers. When it is remembered that the air in the cylinder is compressed to about 600 or 700 lbs. to the square inch, and that the oil has to be injected at a still higher pressure, it will be understood that it is difficult to do this without the use of a powerful air compressing system. A three stage air compressor means expense, additional weight and space. Compressed air is, of course, necessary for starting and manoeuvring purposes, but if the main compressor could be done away with, it would simplify the design and mean less complication. Already several devices have been patented to accomplish this end, and, in fact, there is a Continental Diesel engine in the market, in which the oil is injected into the cylinder in its liquid state.

One of these systems which deserves, perhaps, more than usual attention has been designed by Mr. James Kechnie, of Vickers, Ltd., and is made by the well-known Barrow firm, who, by the way, have given a deal of attention to experimenting in this direction. In this arrangement, the fuel is pumped at a high pressure into a tube, manufactured of a material which yields to the pressure of the oil, and on the opening of the injection valve, this tube contracts and forces the oil through the pulverizer into the cylinder. The pressure in the tube is, of course, greater than the pressure of the air in the cylinder, and the oil is sprayed into the cylinder in much the same way as it is injected by the use of compressed air on the present type of Diesel engine. The effect on the fuel consumption in this system is nil; in fact, in certain instances, there was a slight improvement.

To obtain a very high pressure, a grooved distance piece is inserted in the tube which prevents it contracting to its full extent. The result of this is that expansion does not commence until the pressure has risen to something like 2,500 lbs. per square inch. Whether this system is suitable for heavy oils, such as tar oils, is not yet known, but there is no reason, we can see, why it should not be applicable. Within the next few years, there will doubtlessly be many improvements made in Diesel engine design, and our own opinion is that improvement will be on the lines of increased simplicity, and that an effort will be made to perfect and popularize the solid injection Diesel.—J. C.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Robert S. White, Montreal Collector of Customs, has been appointed shipping master for the port of Montreal, in place of Mr. William Cunningham, who has resigned.

Wigham Richardson, of the shipbuilding firm, Swan, Hunter, Wigham Richardson, Ltd., Newcastle-on-Tyne, England, is now on a tour through Canada.

Captain Benjamin Dorland, one of the few remaining old-time lake captains, died at his home, 182 Beatrice Street, Toronto, on May 29. Captain Dorland was born in 1847, at Bronte, Halton County, where he resided for many years.

A. D. Swan, until recently assistant chief engineer of the Montreal Harbor Commission, and Captain P. Sidney Morrissey, left for New York en route to Chile on Friday last. Mr. Swan will report on sites for harbors in South America for a British Company.

Captain Gambell, of the Allan Line Steamship "Virginian," which sailed from Montreal for Liverpool on Thursday, June 19, is making his last trip on that vessel, he being slated to take command of the S.S. "Calgarian" now completing on the Clyde for the same company. Captain Gambell has served 28 years under the Allan Line flag.

John S. MacLean has been appointed to take charge of the publicity and advertising work of the Canadian General Electric Co., Ltd., and of the Canadian Allis-Chalmers, Ltd., with headquarters in Toronto. The latter Company, in addition to manufacturing an extensive line of machinery and appliances, will also act as sales agents for all the products of the Canada Foundry Co., Ltd. Mr. MacLean held a similar position with Allis-Chalmers-Bullock, Ltd., for a number of years.

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balacava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

Capt. William Steeves has left for England to bring to Canada the new freight steamer W. H. Dwyer, built there for Forwarders, Limited, of Kingston. The Dwyer will go into service on the Great Lakes and the St. Lawrence River and Gulf. She is expected here by the end of the present month.

Captain Rostron Again Honored.—The British Board of Trade have received, through the Foreign Office, a gold watch, which has been awarded by the Emperor of Austria-Hungary to Commander A. H. Rostron, R.N.R., formerly master of the steamship Carpathia, of Liverpool, in recognition of his services in rescuing certain Austro-Hungarian subjects who were on board the Titanic when she foundered.

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.

President—James Playfair, Midland; **Counsel**—F. King, Kingston, Ont.

GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

Chairman—W. F. Wasley, Gravenhurst, Ont. **Secretary**—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.

President—A. A. Heard, Albany, N.Y. **Secretary**—M. R. Nelson, New York. . . .

THE SHIPPING FEDERATION OF CANADA

President—A. A. Allan, Montreal; **Manager and Secretary**—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; **Grand Secretary-Treasurer**—Capt. H. O. Jackson, 378 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

James T. McKee, Box 98 Fairville, N.B. **Grand President.**
Thos. Theriault, Levis, P.Q., **Grand Vice-President.**
Neil J. Morrison, P.O. Box 238, St. John, N.B., **Grand Secretary-Treasurer.**
Jno. A. Murphy, Midland, Ont., **Grand Conductor.**
George Bourret, Sorel, P.Q., **Grand Door-keeper.**
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont. **Grand Auditors.**

Chief Engineer Hale, of the C. P. R. liner Montcalm, has just completed his two hundred and fortieth round trip across the Atlantic. The Montcalm's chief engineer has completed his 88th voyage in that vessel. It is interesting to note that Second Engineer Skinner has also completed his 88th voyage in the Montcalm. Both he and the chief engineer joined the ship at the same time, more than twelve years ago, and have been with her ever since.

L. A. Walker, representing W. R. Grace & Co., was in Vancouver this month, to make arrangements for shipments of freight from San Francisco to British Columbia ports by the new British steamer Colusa. The Colusa is the first of a number of new steamers which will engage in the Vancouver trade, and was built at Port Glasgow. She was launched on February 7, and after coaling at Cardiff proceeded to this coast. She is a steamer of 8,000 tons d. w. capacity, and is 424 feet in length, with a beam of 58 feet.

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto.	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John.	2	H. E. Berry,		G. T. G. Blewett,	65 Harrison St., St. John, N.B.
Collingwood.	3	W. T. Rennie,	Collingwood.	Robert McQuade,	P.O. Box 97, Collingwood.
Kingston.	4	A. E. Kennedy,	395 Johnston Street.	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal.	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria.	6	Alex. McNivern,	P. O. Box 234.	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver.	7	Andrew T. Roy,	1212 Burrard St.,	E. Read,	859 Thurlow St.
Levis.	8	Helaire Mercier,	3 St. Joseph St.	S. G. Guenard,	Laizon, Levis, P.Q.
Sorel.	9	Geo. Gendron,	Sorel, P.Q..	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound.	10	W. Robertson,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor.	11	Alex. McDonald,	28 Crawford Ave,	Neil Maitland,	221 London St. W., Windsor, Ont.
Midland.	12	Jos. Silverthorne,		Jno. A. Murphy,	Midland, Ont.
Halifax.	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault S. Marie.	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown.	15	J. F. McGuigan,	38 Queen St.	Lem Wincheste-	302 Fitzroy St., Charlottet'n, P.E.I.
Twin City.	16	Arthur Abbey	Fort William, Ont.	John A. Smith,	Fort William, Ont.

C. N. R. STEAMSHIP PURCHASE.

WE are informed that the Canadian Northern Railway Co. have purchased from the Great Western Railway Co., of England, the turbine steamer St. George, which vessel was on the Fish-guard to Rosslare service. Built in 1906, by Cammell, Laird & Co., Ltd., of Birkenhead, the steamer has a speed of 23 knots, and is 350 feet in length.

The purchasers are the owners of the Royal Edward and Royal George, running between Bristol and Canada, and it is intended, after extensive overhaul and repairs at the hands of the builders, that the St. George will cross the Atlantic for service on the Canadian seaboard.

**ENGINEERS
BOILERMAKERS
BLACKSMITHS**

CLYDE IRON WORKS

*Marine
Repairs
Our Specialty*

W. J. C. White
22 Prince St. MONTREAL
Phone M. 2435.

**GEORGIAN BAY SHIPBUILDING
& WRECKING COMPANY**

MIDLAND,

ONTARIO.

Yachts, Tugs, Dump Scows
and Repair Work a Specialty.
All Kinds of Wrecking and
Diving.

BELL TELEPHONE :
Office No. 163 Residence No. 149
P. O. Box 83.
D. G. DOBSON, - General Manager

THE DIXON MFG. CO.

Mfrs. of

High-Class Marine Gasoline Engines and
Marine Motors, Experimental Machinery,
Gray Iron, Brass and Bronze Castings.

Repair work a specialty.

Address: COLLINGWOOD, ONT.
Tel. No. 164.

DAVIS DRY DOCK COMPANY

Builders of Wood and Steel Passenger
Steamers, Tug, Steam and Gasoline
Engines of all Descriptions. New
catalogues February 1st.

KINGSTON, ONTARIO

Office 'phone 528.

Private 'phones 437 and 49

**Donnelly Salvage and
Wrecking Co., Ltd.**

Kingston, Ont.

Tugs, Lighters, Divers, Steam Pumps,
etc., supplied on shortest notice.

700 Ton Lighter with McMyler clam
shell Derrick.

Tug "Saginaw" has two 100-ton Pull-
ing Machines with 4,000 feet of 1½ inch
Steel Cable, and two 3-ton anchors,
always ready for work.

JOHN DONNELLY, Pres. and Gen. Mgr.

J. J. TURNER & SONS

Peterborough, Ont., and Regina, Sask.

The largest manufacturers and dealers
in Canada of

Sails.

Tents.

Flags.

Life Belts.

Life Buoys.

Waterproof Cloth-

ing.

Coal Bags.

Horse Blankets.

Lap Rugs.

Canoes and Row

Boats.

Vessel, Yacht, Boat,

and Canoe Sails

made by Expert

Sail Makers.

Tents to Order and Camping Outfits to rent.

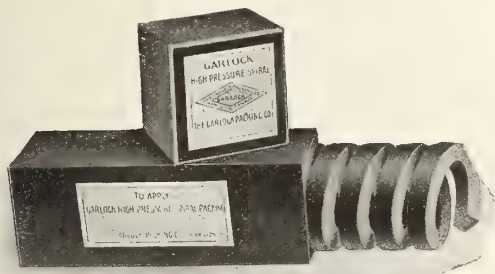
Write for Catalogue.

The SECRET of PRODUCING

High Pressure Packing that will give reliable and efficient service without injury to piston rods lies in the thoroughness of its lubrication as well as in the quality of material used. Every fibre of Garlock High Pressure Packing is thoroughly lubricated, and the design, material and workmanship are unexcelled.



Garlock High Pressure Ring.



Garlock High Pressure Spiral

Write for Garlock catalogue showing

"Packings for Every Purpose."

The Garlock Packing Company

Head Office and Factory:

HAMILTON

:

ONTARIO

Branches — MONTREAL

TORONTO

WINNIPEG

"Pioneers in the Packing Business."

The advertiser would like to know where you saw his advertisement—tell him.

Storey upon Storey—Story upon Story

¶ Cass Gilbert, architect of the cloud-high Woolworth building, didn't stop the contractors when they had the first floor steel up, because the building didn't look finished.

¶ He was content to wait while, storey after storey, higher and higher, the structure reared its bones above the common level.

¶ He was satisfied to wait while the details of his plans were worked out—piece by piece, storey by storey, week after week, month after month, until the finished giant stood out one day in all its glory—catching the first rays and the last of an approving sun.

¶ He had a vision of the giant structure when the plans were drafted. He knew that success was ahead. The owners of the building had confidence in him and backed him up. The contractors followed specifications to the letter, and a big success and an everlasting monument to man's genius, nerve and pertinacity was the result.

¶ There would be more and greater business successes if there were more Cass Gilberts as advertising managers and more Woolworths to back them up. Advertising successes are built up just as the Woolworth building was—storey after storey, according to a preconceived and well defined plan.

¶ There are too many one storeyadvertisers. They can't catch the vision of a big success, or if they can, they get dizzy-headed when they contemplate the height. They lack the nerve to back the advertising architect, and they doubt the greatest of all contractors—printer's ink.

¶ It will take months, and sometimes years to build up a big business through advertising.

¶ But once that building goes skyward, neither the adverse winds of competition, nor the earthquakes of changing conditions and hard times will ever shake it! There is only one condition—the foundation must be as solid as the rock upon which the Woolworth Building stands, and that foundation must be Honest Goods and Honest Prices and Honest Service. If you can build on these, there is no limit to the possibilities of your business. Otherwise your structure will totter and crumble over your head—as it should.

¶ Get the vision of a bigger business! Start to-day to make it a success through advertising, column upon column, story upon story, week after week. Keep at it. That's the idea! Keep everlastingly at it till results come in a satisfying measure.

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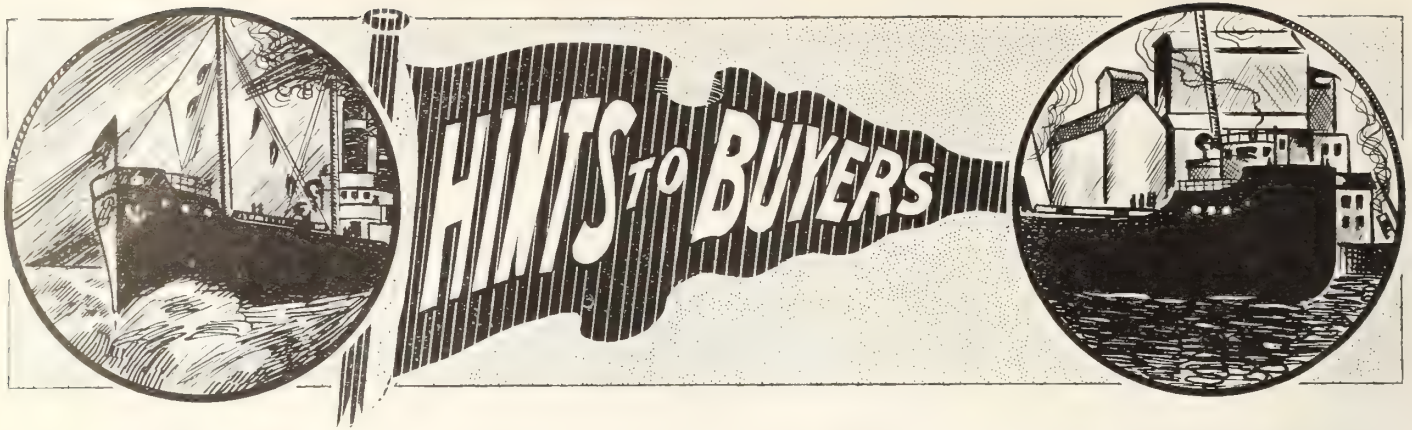
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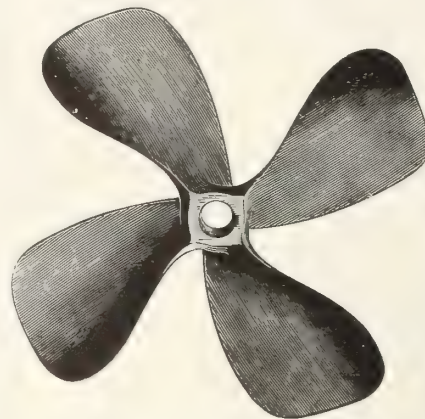
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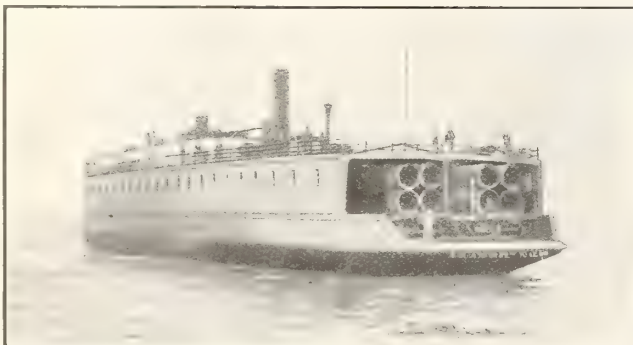


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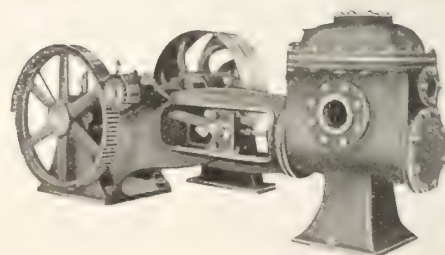


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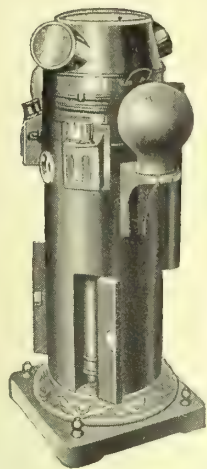
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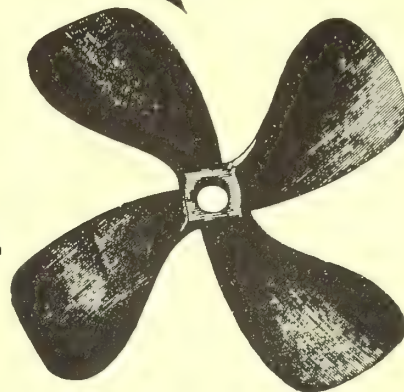
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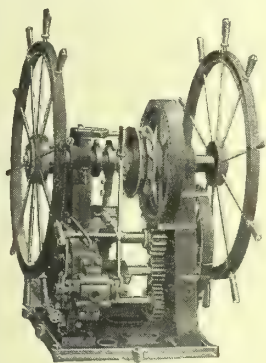


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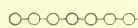
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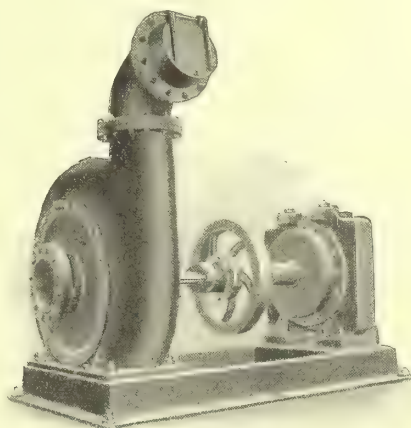


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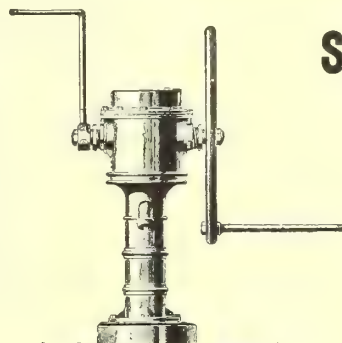
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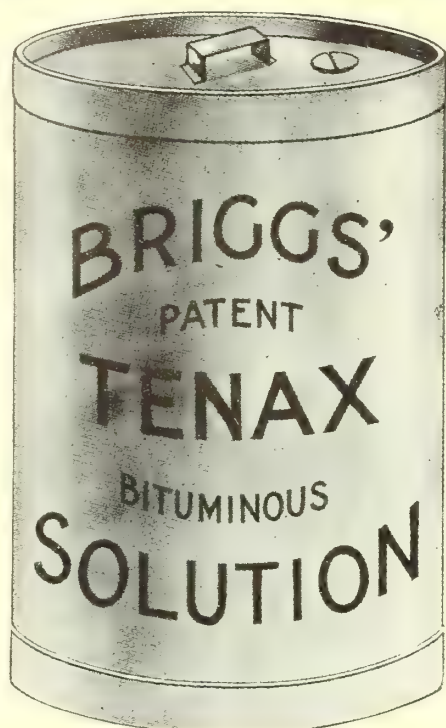
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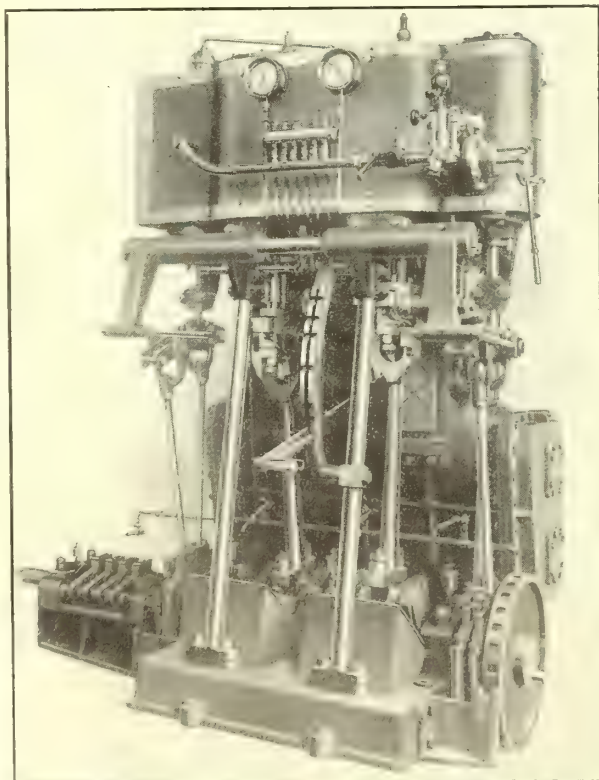
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¶ It cranked the engine of progress that had stalled within him and set to work the rusty machinery of his ambition.

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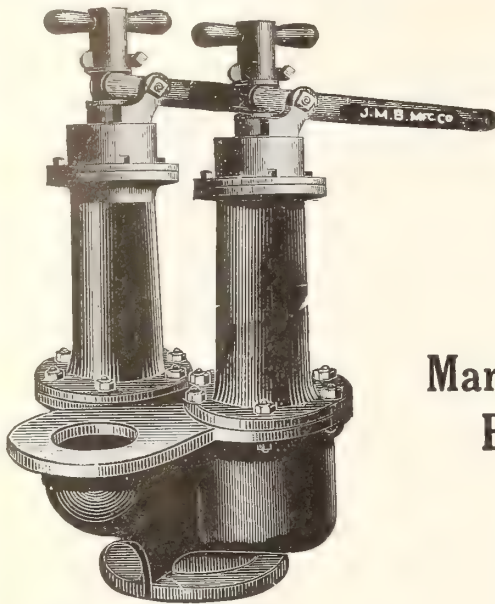
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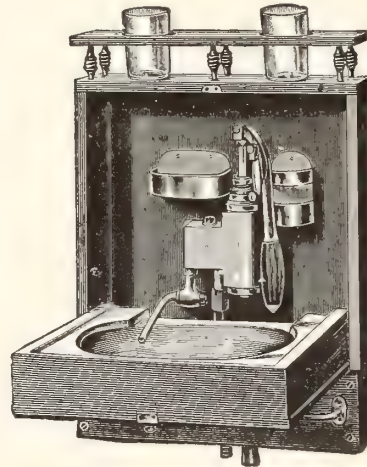
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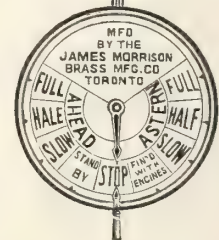


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Electric Propulsion of Ships on Canals, Lakes and Rivers

By John Reid and H. A. Mavor

The accompanying article is one that should appeal, not only to Canadian Lake Vessel Owners, but to all engaged in the navigation and handling of our lake craft generally. The authors of the paper are thoroughly intimate with the conditions existent, and their confidence in the new system of propulsion proposed is so unbounded, that the coming of the "Tynemouth" to our shores will be anxiously awaited.

ONE of the most interesting papers at the summer meeting of the Institution of Naval Architects at Glasgow was that entitled, "A Case for Electric Propulsion," by Messrs. John Reid (member) and H. A. Mavor.

Mr. H. A. Mavor, who read the paper, said:—The development of the canal barge or freighter presents a problem of much greater interest and importance than may at first sight appear. No one who travels on the great rivers of Europe, on the Rhine, Danube, or Volga, can fail to observe the immense traffic which they bear, and the remarkable way in which the vessels employed in such traffic have been designed to suit local conditions and requirements.

It is so, also, on the great North American inland waterways, the importance of which, as affording the only system of transportation which can compete with the railroad, has been very generally recognized. Perhaps, nowhere in the world is the influence of local conditions on vessel design more recognizable than on the Great Lakes of North America, where the immense quantities of bulk ore, coal, and grain, which have to be handled in a short six months' season, the importance of quick loading and discharge, the shallow nature of the canal and river channel connecting the Lakes, and other local considerations, have led to the evolution of a very remarkable type of vessel, enormous in size, unique in proportions, and unapproachable in the efficiency and economy of its operations.

Conditions in Canada.

The same influence of local conditions on vessel design is very marked in the Canadian vessels which make use of the St. Lawrence and Welland Canals, by which access by water is maintained between the head of ocean navigation at Montreal and the end of lake navigation proper at the eastern end of Lake Erie. This canal system comprises the range of canals by which vessels are enabled to pass the currents and rapids of the St. Lawrence River above Montreal, and the Welland Canal, by which the difference in levels between Lake Erie and Lake Ontario, of which the Falls of Niagara is the outcome, is surmounted.

In this series of canals the limiting draught is 14 ft. under normal water

conditions in many of the canal reaches as well as on the sills of the numerous locks. These locks themselves are for the most part of a standard size, permitting the convenient passage of any vessel not exceeding 250 ft. between perpendiculars, 42 ft. 6 in. beam over plating, and drawing not over 14 ft. in fresh water. Larger vessels have been locked through, but only with difficulty, and for our present purpose it may be taken that the above dimensions cannot safely be exceeded.

The Short Season Feature.

When it is considered that a Canadian canal vessel can only operate on the Lakes and canals for six months in the year, owing to prevailing ice conditions, and that for various reasons it is not possible to employ it during the off Lake season in any deep sea trade, and when it is remembered that the trade in grain, coal, pulpwood, package freight, etc., between Montreal and the Upper Lake ports, and vice-versa, is already very large and rapidly increasing, it will be easily understood that not only is it of prime importance to carry the utmost possible deadweight per trip on the limiting draught of 14 ft. but it is equally important to obtain quick loading and discharge, and to lose as little time in negotiating the canals and locks of the St. Lawrence and Welland systems as possible.

The last consideration is due to the fact that, as the speed in the canals is limited to four miles an hour, and as there is ever present in the canals the possibility of vexatious delay on account of passing vessels, railway swing bridges, waiting turn at locks, interference from fog or darkness when the main canals cannot be navigated, and so forth, the vessel cannot too quickly escape into open water, where only can continuous navigation at full speed be carried on. Under these conditions it is fair to state that anyone starting out to design or build a canal vessel suitable for the Canadian trade without reference to the local conditions, would be pretty certain to produce a failure, however successful the vessel might be in open water alone.

Locking Operations.

For example, in attempting to enter a lock which is only 45 ft. wide with a

vessel which is 42 ft. 6 in. beam, and under which there may only be an inch of water over the canal bottom, it would be natural to expect that the navigating officer would arrange to approach slowly, pass lines ashore, and gradually warp the vessel in. To follow such a course would probably obviate a great deal of canal damage which these vessels now sustain, but it would inevitably entail such a delay in the locks as would most seriously reduce the vessel's earning capacity.

Actually the course followed is for the navigating officer, as he approaches each lock, to line up his vessel as well as wind and current will allow, and to enter at considerable speed, so as to displace the lock water past the vessel's sides as quickly as possible. Full stop a few feet short of the gate ahead is obtained by quick engine reverse, and by holding on with an extra heavy compressor to a snubbing wire made fast to a mooring pin on the quay. When the vessel has risen or descended in the lock, it is equally important to get under way again with the least loss of time, which is usually done by passing a mooring wire forward along the lock wall or canal bank and warping out for a short distance until the propeller can get the vessel up to the desired speed.

The Propeller Feature.

It will be at once apparent that under such conditions as I have outlined, the form of the propeller, its revolutions, and its control must play a most important part on the efficiency of the vessel as a canaller. Engineers experienced in this line of work look for a screw which will cause this very full-formed vessel to respond immediately to its actions, and, of course, there goes with that an arrangement of propelling machinery which must respond immediately to the demands of the engineer in charge. A quick-acting throttle and an instantaneous and positive reverse are all important. These would be valueless, however, to the desired end but for a propeller which will enable the vessel to be driven into and out of a lock with the least loss of time.

Bear in mind that in entering the lock there is a direct resistance from the water throttled in front of the vessel, and in leaving the lock a corresponding

vacuum tendency, behind the vessel, and a refusal of the water to flow quickly through the restricted channels between the vessel's sides and the lock walls towards the propeller. Evidently, for successful work under such peculiar conditions, everything depends on the propeller. Note that there is no question here of hull form; that is to all intents and purposes fixed and unalterable. It will be understood that if a Canadian canal vessel has to pass every week through a hundred or more locks, and if the time lost in locking can vary from 70 per hours per week for an unsuitable type to 40 for a well-designed and wellhandled canaller, it may be well to design rather to overcome the lock and canal delay than from mere considerations of the best speed obtainable in open water, especially as the time which many of these vessels spend in open water is very short.

Driving Power Ahead and Astern.

It has been found, for example, that by the use of a very broad-bladed propeller, with a pitch ratio 1.1, and at about 80 revolutions per minute, the best results can be obtained in locking operations. The propeller is so designed that it has great driving power ahead and astern in locking operations, quickly decelerating and accelerating the speed in manoeuvring into or out of a lock as the case may be. If one, in imagination, place a vessel in one of the locks, which it absolutely fills, we will the more easily realize the general helplessness for efficient results of any small fine-pitched high-speed propeller, however excellent that type might be in open water work. Furthermore, in lining up to enter a lock, the broad-bladed Canadian propeller can be utilized to throw over the stern of the vessel without occasioning headway, by giving the big coarse screw a short full-speed impulse with the rudder hard over. This is done as a last resort in entering a lock to prevent a foul entrance, the occurrence of which generally results in a heavy blow on the one bow, a rebound with a blow on the other bow, and finally a severe nip abreast of No. 1 or No. 2 hatch, with the inevitable consequence of serious structural straining, leaky rivets, and damaged cargo.

Hull Design.

When the design of the hull is carefully considered, it is found that other circumstances, for the most part arising from local considerations, militate against any advantage being taken of the fact that these vessels trade in comparatively sheltered waters to reduce the scantling in an effort to add to the deadweight. The main scantlings, framing, and plating must be fully up to

deep-sea requirements, apart altogether from the fact that these vessels, being largely built in the United Kingdom, have to make passage to Montreal, generally in a two-thirds full load condition, over the stormiest region of the Atlantic. It is essential, in fact, to have even stronger close spaced main framing forward, almost as if providing against ice, to enable the vessel to resist the continual pounding against the lock walls and approaches, to which it is inevitably subjected in this canal trade.

The double bottom must be deep, so as to provide ample water ballast to get the vessel well immersed in ballast trim, otherwise canalling and locking become impossible in a high wind, a great cause of lost time for badly designed vessels. The bottom plating must not be less than $\frac{1}{2}$ in. to resist occasional rubbing in the canal; the tank top plating must be equally heavy to withstand blows from the unloading grabs; the bilges require 23-40 for protection against canal bank rubbing; and the docks must be heavily plated and well supported for deck cargoes of pulp wood and lumber which may be stacked as high as 14, 16, and even 20 feet above the deck.

The Deadweight Feature.

Under these conditions, if an attempt is to be made to increase the deadweight carried on the canal draught of 14 feet—and owners are perpetually urging such increase—it is found that a limit is soon reached beyond which no reduction in weight of scantlings is possible, and as the form is usually .83 block, or fuller, the deadweight capacity cannot be materially increased by any changes in hull, form, or structure. In a word, the designer is bound hand and foot as to dimensions, form, and hull weights, and is, therefore, driven to reconsider his propelling machinery in an effort to economize in the weights of machinery and fuel. It is this fact that makes this class of vessel a most natural type in which to experiment with the internal combustion marine engine of the Diesel or other type. First efforts, however, were devoted to adapting the gas engine and producer, because while fuel oil is very plentiful and cheap on the Lakes, coal of all kinds including anthracite, is even more widely available, and at very reasonable rates. Therefore it was natural to consider the producer-gas proposition in the first place.

The Marine Gas Engine.

In 1908-1909 the marine gas engine had not been reduced to any very practical or reliable form, and the land engines built and running offered very little in the way of experience to guide

one in adapting them to marine work. Reliability was doubtful, reverse uncertain, revolutions much too high, and reduction gear at that time by no means to be relied upon. Finally, the attempt to adapt the gas engine was reluctantly abandoned, and the experience of other investigators in this field goes to show that this was an escape from an adventure full of trouble. One thing, however, the writers' investigations did indicate, was that no internal combustion engine then extant could be coupled direct to a Lake type of propeller, and that to substitute a suitable type of propeller for the proposed engine, regardless of local requirements in Canadian waters, was to court certain failure under the conditions indicated above.

Mechanical Reducing Gears.

Mechanical reducing gears, though considered, did not offer any great prospect of success, because the reversing gear on the main engines had to be retained, which certainly promised another source of weakness and loss in canalling, possibly a failure to start or to stop under conditions as regards locks and gates certain to result sooner or later in serious disaster. At this time electricity seemed to offer possibly the best prospect of successful solution to the problem. Being satisfied that the single Lake type of propeller and the facilities for manoeuvring the same under steam would have to be retained if failure was to be avoided, it remained to find some third feature through which the desired large slow-turning propeller could be reconciled with the comparatively light high-speed internal combustion engine of the Diesel or other type. It must be admitted that the introduction of electricity for this purpose, while committing one to a certain loss in transmission, gave assurance of certain incidental advantages of great value, which had not originally been anticipated.

The Triple Expansion Steam Engine.

No internal combustion engine, Diesel or other known to the writers, is an absolute substitute so far as simplicity of operation and reliability of handling are concerned for the ordinary up-to-date triple-expansion steam engine, even in deep-sea go-ahead work, much less in manoeuvring in narrow waters within harbour limits or in rivers or canals. Whatever success may have been obtained by the recently developed two-cycle, slow-speed, marine type of Diesel engine, and there is here no suggestion that success has been other than most encouraging, it still seems that the line of development followed is not such as seems likely to lead to the evolution of current at 220 volts to motors located

a propelling engine which an owner will be as ready to have in his vessel as he would an ordinary steam outfit.

Attention has been paid to obtaining a special resemblance to the marine steam engine in an effort to make the Diesel engine exactly suited to take the steam engine's place direct on the propeller shaft for the sake of a simplicity which is more apparent than real. To get the low revolutions most desirable for propulsion in slow-speed cargo vessels, important advantages in the normal Diesel engine, such as high speed, low weight, and moderate over all dimensions, have been sacrificed, while the necessity for fitting reversing gear on the engine itself has added a most unfortunate complication necessitating the lavish use of compressed air in manoeuvring, an addition of a particularly troublesome and expensive nature. Furthermore, experience has already shown that the use of large single-screw Diesel engines in propulsion is attended with grave risk of the breakdown of the whole propelling mechanism of the vessel.

Diesel Engine Delicacy.

It is idle to deny that there is inherent in the very operating principle of the Diesel engine an element of delicacy and unreliability very little in keeping with the rough work of marine propulsion from which the modern steam engine emerges with credit. The fuel economy, which has been the one real outstanding claim for the adoption of the Diesel engine is, in fact, dependent on an operation of great nicety involving the use and maintenance of very delicate mechanism. A governor action controlling this mechanism is set in motion by the racing of the engine in a seaway and the cycle of the cylinder operations, so far from continuing uniform as is essential for good working, are periodically interfered with, probably under impulses given too early or too late, with inevitable trouble.

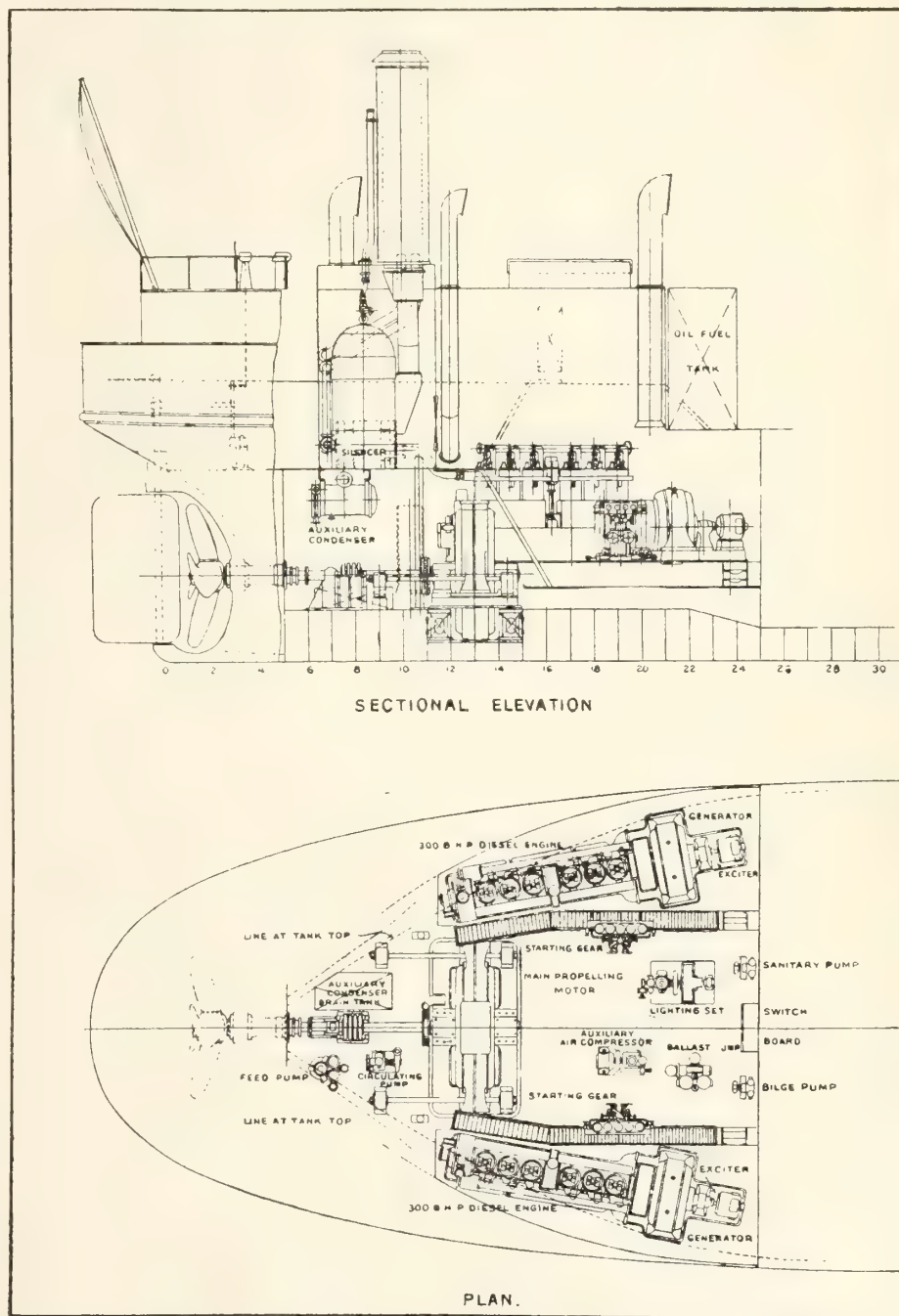
It must be considered also that no engine of the Diesel type, with its numerous spring-loaded cam-driven valves and other fine-set gear, can take kindly to the vibration set up by the action of a vessel in a seaway. The reference here is particularly to a vessel engined astern; but the same is true of any position of the machinery in direct drive.

Shipowners' Viewpoint.

Finally, any adjustments necessary on the Diesel engine, need for which may not be at once apparent, in fact, which may not become apparent at all until serious trouble has developed, must be at once attended to, to avoid trouble, whereas in a steam engine they may without serious detriment be put off to a suitable opportunity.

Enough has been said to indicate some of the points which experience has already developed as requiring consideration in the present Diesel type of marine engines before its reliability can be confidently placed in the same category with that of the triple expansion steam engine. After all, it is the average shipowner's wish to have a ship which, while attaining all reasonable

tainty of the mechanism which they displace. Therefore it is suggested that it is unfortunate that so much effort has been devoted to attempting to force the Diesel engine into conditions of service for which it appears inherently unfit, without saying that in certain classes of vessels where the conditions are special, there may not be a perfectly legitimate field for the type criticised, viz., the



LAYOUT OF MAJOR SYSTEM OF VESSEL PROPULSION. CANADIAN LAKES AND CANALS.

efficiency and economy in its operations, shall be first and foremost, trustworthy, and the propulsion of which will be carried on as surely as the limitations of the best engineering mechanism will permit. It is hopeless to introduce new methods of marine propulsion which do not guarantee all the security and cer-

direct-drive, slow-speed, two-cycle open marine engine.

Diesel Unsuitable for Canadian Canal Service.

Such scope is most assuredly not found in the full-bodied cargo boat, still less in the Canadian Canal vessel

under the peculiar conditions and limitations above described. It is unthinkable that, with its present form of hull, which cannot be varied, and the still more definitely fixed type of propeller, the present triple-expansion engine can be displaced by any direct connected Diesel engine. Eighty revolutions per minute, which is common with the steam engine, is almost hopeless for the Diesel, and however successful the reversing gear may operate in the latter engine, it is little likely to be improved by hundreds of rapidly alternating go-ahead and go-astern motions required in negotiating such a series of locks as in the Welland Canal.

Place of the Diesel Engine.

Broadly speaking, the introduction of electricity in this connection puts the Diesel engine back into work for which it is eminently suited, under conditions which give it every chance to maintain efficiency and reliability. It is as far as possible removed from the uncertain action of the propeller, and the uneven loading and vibration incidental to a direct propeller drive. In Canadian canal work, the power required for propulsion varies between very wide limits. In the canals themselves, four miles being the limiting speed, 150 i.h.p. or less is sufficient though full speed must be always available for emergency, especially in backing. In the open lake, in fair weather, 500 i.h.p. is sufficient to maintain fair speed, while 750 i.h.p. is necessary in contending with the St. Lawrence currents. In some designs, the writers, therefore, proposed three Diesel generating units of 250 i.h.p. each of which can be switched on to the propelling motor as required.

Diesel Electric Arrangement.

In the Tynemouth, which is now building, to demonstrate the Diesel electric arrangement of propelling machinery, a two-unit subdivision is arranged for, each unit furnishing 300 b.h.p. The electric system adopted is that identified with the name of the second writer, involving the use of alternating current. Investigation and actual tests have amply shown the suitability of this system for marine propulsion.

This system has for its special object the simplification of the electric equipment. Many applications of electric power have been made to marine propulsion, but hitherto, with the exception of the Electric Arc, propelled on this system, and built in 1911, continuous currents only have been used, the reason being that regulation of speed and control is easier for continuous current under ordinary conditions than for alternating current.

The disadvantages attached to the use of alternating current in respect of

regulation are associated with the greater number of conductors and particularly with the property of alternating current motors, that the speed of the motor bears a fixed ratio to the speed of the generator, and that any departure from this speed is associated normally with loss of efficiency and with more or less complicated devices for changing the frequency of the current alternations.

In the system under notice these difficulties are overcome by the use of more than one frequency applied to each in-

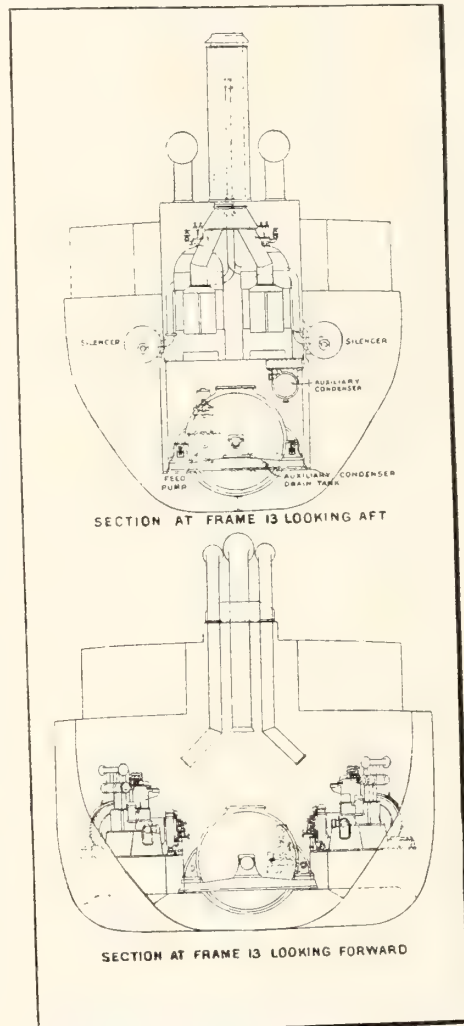
driven by Diesel engines running at 400 revolutions per minute. The electrical output from each set is 235 kilovolt amps. at 500 volts alternating. The generators have six and eight poles respectively, giving frequencies of 20 and 26.6 per second. The exciting current is obtained from direct connected continuous current machines on the same shafts as the alternators. The normal exciting current is 30 amps. at 100 volts. A single three-phase motor is coupled direct to the propeller shaft, which is the ordinary type with marine thrust block. The motor develops 500 s.h.p.

The rotor or moving part is of the simple squirrel cage type, without any electrical or mechanical connection other than its rigid attachment to the propeller shaft. The stationary part of the motor has two separate non-inductive windings for 30 and 40 poles respectively. When each of these two windings is connected to the appropriate generator, the speed due to each is 78 revolutions per minute. By changing the connection on both windings, the direction of rotation is reversed, and by connecting the 40-pole winding of the motor to the 6-pole generator, the speed in either direction drops to 58 revolutions per minute, or about three-quarters of the full revolutions.

If full speed be not required, one generator may be stopped, and the other left running at full revolutions under governor control and at full economy, because the power required to drive the ship at three-quarters speed is about half of that required to drive it at full speed. If either of the generators be left attached to its own winding, and the other generator shut down, the ship is propelled by either engine at a little over half speed, the speed of rotation of the ship falling with the speed of rotation of the engine, until an automatic adjustment of power and speed is reached at about half-speed.

The Control Gear.

The control gear consists of an apparatus for changing the connections of the generator and motor windings respectively. There are five positions on the switch, corresponding to the ordinary positions on the engine-room telegraph. They are "Full Speed Ahead," "Half Speed Ahead," "Stop," "Half Speed Astern," and "Full Speed Astern." Each position of the controller is definitely fixed by means of cams and rollers, so that stopping at intermediate positions is prevented. The controlling gear provides for the interruption of the excitation of the generators while the switch is being moved from one step to another, the exciting switch and the main switch being inter-



LAYOUT OF "MAVOR" SYSTEM OF VESSEL PROPULSION, CANADIAN LAKES AND CANALS.

dividual motor. The currents of different frequency are carried in independent mutually non-inductive circuits, the magnetic systems being entirely independent but operating upon a common rotor, so that their mechanical effects can be superposed and the power transmitted in the separate circuits combined to produce the required mechanical effect. The required currents may be obtained from one or more generators.

Equipment of the "Tynemouth."

In the Tynemouth, the equipment consists of two three-phase generators

locked so that the switching-over operation is accomplished while the electric circuits are "dead," thus avoiding, injurious sparking. Should it be found convenient, a very simple arrangement could be made whereby the control could be operated from the bridge of the vessel, and the engineer's attention confined to the keeping of his engines lubricated and supplied with fuel to run at constant speed.

It will be seen that this method of control entirely dispenses with the stopping and starting of the Diesel engines for manoeuvring, an operation which, in itself somewhat difficult, becomes impossible if a liberal supply of compressed air be not available. To keep up a supply of compressed air for manoeuvring the vessels in the locks and channels of a canal involves the upkeep of a very expensive and inefficient air-compressing plant, and the dispensing with this auxiliary is a very important feature of the system. It is also advantageous to have two units, each capable of driving the ship, so that in the event of any interruption to the running of either, the vessel is still under control.

Electrical Equipment Functions Recapitulated.

The functions performed by the electric equipment may be recapitulated:—

- (1)—It adapts the speed of the engine to the speed of the propeller.
- (2)—It combines the power of separate engines and applies the whole to a single propeller, with perfect freedom to use either or both power units.
- (3)—It provides a simple and easy reversal of the propeller, while leaving the engines running in one direction at constant speed.
- (4)—It also provides ready means of distant control should this be required.

It will be seen that the use of mechanical gearing could perform the first, and the first only of these functions, and, for this reason it is anticipated that, compared with a mechanically geared or direct connected Diesel engine equipment, the electrical equipment will offer very material advantage in the operation of the vessel in the special circumstances under which it is placed.

The writers have endeavored to show how important and, indeed, even indispensable for reliability and efficiency, the use of electric transmission may be in the propulsion of so relatively simple a type as this Canadian barge where it is decided to adopt the Diesel engine. This should help to dispose of the too prevalent idea that the natural scope for electrical propulsion is in warship or other highly specialized vessels in which electricity might provide means for adjusting economically the power generat-

ed to the very conflicting power requirements, say, under peace and war conditions. Undoubtedly a battleship or battle cruiser does offer the very best scope for the electric drive, but only because that class of vessel presents on a large scale the same problems in propulsion which are found in almost all other vessels, viz., how to adjust efficiently and economically the power available to the power required at any given time, not necessarily always from the point of view of propulsion alone.

Tramp Steamer Logs Analysis.

From the analysis of the voyage logs of an ordinary tramp steamer, the second writer has shown how important towards efficiency of propulsion might be the introduction of electric transmission, with the added economy of a modern high-speed re-action turbine as the power generator in place of the usual triple-expansion engine, and, of course, in this case such possibilities of economy are confirmed by the results since obtained with mechanical gearing introduced for the same purpose. An advantage, however, lies with the electrical arrangement, in that it permits a much wider range and variation of revolutions between the propeller and the turbine, permitting also a more advantageous sub-division of the generating plant into units of different sizes, and finally eliminating the necessity for reverse in the turbine and simplifying the control.

In the United States, Mr. Emmett, of the General Electric Co., has also shown the suitability of electric propulsion for a deep-sea collier of great size and 7,000 h.p., for which the equipment has already been completed and tested with the most brilliant results. From such a vessel to a large passenger liner such as the *Celtic*, is a mere step, and in such vessels also, the possibilities of economy and all-round efficiency are most marked.

Problems to Face.

In such matters, it is much too common to pronounce judgment for or against without adequate analysis of the problems which are as numerous and varied as the vessels which come up for consideration. Trial-trip data, however valuable for comparative purposes, cannot be used as a guide, because what we are concerned with is maximum efficiency in working conditions; not propelling efficiency alone, but the innumerable phases of the working a ship, of which propulsion is, perhaps, the most important, all of which have a bearing on the general efficiency of its operation.

Experience in developing a comparatively simple type, such as this Canadian Canal vessel, shows that it is fre-

quently quite impossible to convey to the builder any adequate conception of how such a vessel is handled, and has to be handled, to get maximum efficiency out of it in the short six months' season. What Lord Kelvin used to call the "bias of preconceived notions" is apt to prevent a detached view on the part of a builder, especially when a decided departure from established practice and precedent is called for. For example, the idea that special scantling provisions forward should be fitted to any type of vessel to enable it to "butt" stone walls and quays with impunity seems to many builders very unreasonable, though the same builders might not hesitate to fit special bow stiffening against ice.

Scepticism Regarding Electricity in Marine Propulsion.

It is for this same reason that one is not surprised to meet with considerable scepticism in regard to the scope for electricity in marine propulsion. To the majority of sea-going engineers, the idea of a transmission feature between the driving engine and the propeller is simply anathema. To prevent such an introduction, an infinity of pains will be devoted to experimenting with high-speed propellers and low-speed turbines and oil engines with an all-round lowering of total efficiency, and an increase in complication actually in excess of that which it is desired to avoid. There are not 10 per cent. of the merchant vessels now afloat which would not be most efficiently propelled by screws designed to turn at revolutions not exceeding 80 per minute, and for real progress towards maximum efficiency in marine propulsion, one should at all costs retain the simplest form of propeller, the efficiency of which permits of no dispute, and from that basis arrive through the various methods of transmission now available, at an arrangement of machinery best suited to each individual case. At the start, such a scheme of powering a vessel would work a hardship on the builders of standard marine machinery; but it should be understood that, in advocating the use of transmission gearing, one does so to enable the newer forms of power generators to be utilized.

Nothing is more likely to retard the introduction of the internal combustion engine in marine work than the mistaken attempt to treat it as a perfect substitute for the triple-expansion engine which it is intended to displace. It is at this point that electricity acts as a safeguard in a way that no other system of transmission can approach.

Only Possible Solution.

There are, of course, problems of propulsion, the analysis of which shows

that approximately equal results may be obtained whichever form of transmission gearing, electric, hydraulic, or mechanical, is adopted. In such cases, the decision will no doubt lie with that system which offers the greatest reliability and simplicity of operation. The success which has attended the introduction of the geared turbine and the hydraulic transformer is of good augury for similar success with electric transmission, but there is a class of problem in marine propulsion for which the only possible solution is through electrical means, viz., vessels in which propulsion is only one, and sometimes not the most important one, among many functions calling for power, which it is evident would be most efficiently provided from a central generating station. Among such vessels, one might class the larger sizes of warships, with their multitudinous requirements in power for the driving of auxiliary engines as well as propelling machinery, but for purposes of illustration, it is probably better to take a simpler case, such as a dredge, say, of the self-propelled suction type.

Vessels Offering Large Scope.

Attention was first called to the suitability of electric drive for such vessels by Professor Biles and Mr. H. A. Mayor, and Mr. John Reid has recently completed a design for a large vessel of this class which clearly indicates the very important advantages which may be obtained by the introduction of a central generating station furnishing power as required to the propellers, the dredge pumps, or the numerous auxiliary machines.

In a similar steam-driven job, there are four separate triple-expansion engines, two for propulsion, each of 800 i.h.p., and two for the pumps, each of 500 i.h.p., or a total of 2,600 i.h.p. When it is considered that the introduction of the electric system allows the total horse-power generated to fall back to 2,000 as a maximum without in any way prejudicing the operations of the dredge, it is at once apparent that here we have a first-class incentive to adopt an electric arrangement. A further incentive of great importance in such work is the ability which the use of electricity confers to place the complete control of the dredge in the hands of one man, the dredge master.

Here, again, we have evidence of the importance of studying such a problem rather from that of the dredge builder. No real progress can be made until this is done. By a simple system of switches, scarcely more complicated than ordinary bridge telegraphs, one man can handle the whole machine directly with the very greatest advantage to the efficiency of the dredging operations.

Such are some of the most likely cases in which electricity seems to offer a means of solving certain difficulties in the power question, which are, after all, only components of a problem which in one form or another have long confronted the marine engineer, viz., how to generate the power required in a given vessel independently of the means used for propulsion, enabling the source of power for all purposes to be concentrated in a central station with a simple economical and easily controlled system of distribution, by which the power generated for any particular purpose may be exactly related to its requirements.

Average Log For Package Freighter.

The following interesting details of work done were given in the form of an appendix to show fluctuation of power requirements, being the average log of a package freighter of "canal" type, on a voyage from Montreal to Fort-william and return.

Leave Montreal with about 700 tons freight, draughts say F. 10.1 ft.; A. 7.4 ft. From harbor of Montreal enters Lachine Canal, 8½ miles long, five locks, speed limited to 4 miles per hour. Time taken, 4 hours. Crosses Lake St. Louis, 15 miles, no current. Time taken at 10 miles per hour—1½ hours.

Soulanges Canal.—14 miles. 4 lift locks, 1 guard lock. Time taken 6 hours.

Crosses Lake St. Francis.—32 miles currents 1 to 3 miles per hour. Time taken, 4 hours.

Cornwall Canal.—11 miles, 6 locks. Time taken, 5 hours.

Williamsburg Canals.—A series of canals alternating with stretches of river, with 5 to 6 mile currents. 12 miles. Time, 5 hours.

To Prescott in river.—30 miles: 5 mile current; 4½ hours. Distance Montreal to Prescott about 125 miles, in which at least 10 hours vessel is stopped altogether, locking and tied up.

Prescott to Toronto.—230 miles, full speed: about 21 hours. Stop at Toronto for cargo. 25 to 35 hours, say 30 hours. Leave Toronto with 1,200 tons cargo, draughts F. 11 ft. 9 in. A., 9 ft. 10 inches.

Toronto to Hamilton.—40 miles; 4 hours. Stop at Hamilton for cargo 25 hours. Leave Hamilton with 1,400 tons cargo, draughts F. 12 ft. 7 in.; A. 10 ft. 8 in.

Hamilton to Port Dalhousie.—30 miles; 3 hours.

Welland Canal.—26¾ miles, numerous locks and swing bridges; 16 to 24 hours, depending on wind and number of boats coming down. Wind is a bad drawback owing to exposed nature of canal. (Vessel is driven over against bank); say 20 hours.

Port Colborne to Courtright on St. Claire River.—300 miles; 28 hours. Stops at Sandwich for coal and packs up freight at small ports. Add 13 hours stopped.

Courtright to Sarnia.—10 miles; 1 hour.

Sarnia to Soo Canal.—270 miles; 26 hours. Allow about 5 hours average delay at Soo taking cargo, waiting for locks, etc.

Soo to Fort William.—260 miles; 26 hours, full speed. Total distance, 1,300 miles; usual time, 9 to 10 days. Loading grain at Fort William, 3 days. Return journey to Montreal, 7 days. Unloading Montreal and waiting turn, 2 days. Loading package freight, 2 days. Total for round trip, 24 days. Actual average is rather longer, 25 to 27 days, owing to delays, Sundays, etc. Burns 16 tons per average day right away.

Trip on S.S. Keystorm, Montreal to Oswego.

This voyage began on July 22, and ended on July 25, 1910, and although the engineer did not join the ship until she reached Lachine, we have the approximate time at the first locks between there and Montreal.

Unfortunately during the trip there were unavoidable delays caused by breaking of lock 18 in the Cornwall Canal. This itself not only delayed us, but tied up a number of boats which all got away together, thus causing further delay in waiting for locks and passing these boats in the canal.

The low power cards were taken in the Soulanges Canal. The canal here is 11 miles long, without a lock, and has power stations at the lower end, which make a current of at least 1½ miles per hour. The speed of the ship was accurately measured by taking the time between posts marked and fixed in the canal bank half a mile apart. This distance the boat made in 7 minutes and 45 seconds at 50 revolutions, which is a speed of 3.87 miles an hour, or practically 4 miles an hour. The draft was 11 ft. 7 in. aft and 13 ft. 2 in. forward. The indicated horse-power as shown by cards was 218.

There are canals without currents, but they are short, and it would be impossible with only one indicator to get the cards in time. In any case it is a difficult matter, as they are constantly changing the speed of the engine. While the boat was in the currents the engines were turning 82 revolutions per minute, 177 lbs. of steam, 48 first receiver, 9 lbs., second receiver, 25½ in. vacuum.

Cards were taken on the lake at the same pressure and revolutions as when running in the currents. The total power developed was 762 i.h.p.; speed

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about 10.25 miles per hour. The coal was accurately measured for six hours, and, allowing 44 cubic feet to the ton, amounted to 15.6 tons per 24 hours, or about 1.9 lbs. of coal per indicated horse power per hour. The coal was of inferior quality, with a high percentage of ash.

The speed of the currents varies; therefore it is hard to get any accurate information regarding their speed by taking the speed of the ship.

On board this trip it was noticed that the boilers were being operated under natural draught while running slow speed and in the canals. This is not good practice and very uneconomical, no benefit being derived from the heating arrangement in the uptake. When working very slowly, the fan if making too much draught can be stopped, but the ash-pit dampers should always be shut, the necessary air being taken through the fan and uptake. Any quantity of ashes should never be allowed in the ash-pit, otherwise the fire bars will get red hot and collapse.

It was also noticed that the injector was used excessively in canals. This is a very inefficient instrument for feeding boilers, especially when a feed pump is in operation and doing the same work. An injector should only be used for feed-salt water or to fill a boiler when all feed pumps are cold, if economy is to be considered, as most of the steam is used to give velocity to the water.

Some of these things are common practice but are not right. The engineer has been instructed on these different points.

In the following report the locks are numbered from Montreal, counting only the locks the boat passes through. The ordinary numbers include some old canals, and are rather misleading.

Lachine Canal.

The total length of the Lachine Canal is $8\frac{1}{2}$ miles, and the total length of lockages, 45 feet.

Lock 1.—In and the gates shut 8.35 a.m. Clear of the gates at 8.55.

Lock 2.—This lock is straight ahead, about 100 yards distant. In and the gates closed at 9.23. Clear of the gates at 9.42 a.m.

Lock 3 (Gabriel).—This lock is about a mile distant. The canal is comparatively wide in places, at other parts it is rather narrow and crooked. There is one bridge immediately on leaving lock 2. There are also elevators, coal and freight wharves along both sides where boats and barges are tied up. In and gates shut at 10.4. Clear of gates at 10.20.

Lock 4 (Cote St. Paul).—This lock is about $1\frac{1}{2}$ miles distant. The canal is narrow all the way, but comparatively

straight; has one bridge and dredges working to repair canal bank. In and gates closed at 11.15. Clear of gates 11.30.

Lock 5 (Lachine Lock).—This lock is about 6 miles distant; has two bridges, and is comparatively straight, but from these canals at different points there is water taken for power purposes, which, besides making an undesirable current, causes eddies around, and in the immediate vicinity of the outlet strong suction, which sometimes draws a ship close to the outlet, when the power has to be shut off before she can be taken away. In passing these a ship must keep well to the opposite bank. In and gates closed at 1 p.m. Clear of the gates 1.15.

Lake St. Louis.

On leaving this lock there is a canal of about $1\frac{1}{2}$ miles in length. Cleared this at 1.40, after which a boat can usually run at a full speed on the lake, although it is only a channel marked by range lights and buoys. There is a current in this channel estimated at a mile an hour, but during the last 4 miles the current is stronger, varying from 1 to a maximum of $3\frac{1}{2}$ miles. The distance is 17 miles.

Slowed down at 3.46 and tied up at the entrance of the Soulanges Canal at 4 p.m., making a total time between locks of 2 hours 45 minutes. The boat was running at half speed for about one-third the distance. This was on account of one of the lightships being out of its position.

Soulanges Canal.

The total length of the Soulanges Canal is 14 miles, and the total elevation of lockages, 84 feet.

Lock 6.—This lock is straight ahead about 200 yards. In lock and gates shut at 4.48. (It takes on an average 8 minutes for a loaded boat to enter lock). Lock filled, gates opened and engine started at 5 p.m.

Lock 7.—This lock is about 300 yards straight ahead; no current or obstruction of any kind. In lock and gates shut at 5.20. Lock filled, gates opened and engines started at 5.30.

Lock 8.—This lock is about 2 miles distant; has one bridge, but no other obstruction. In and gates shut at 6.16. Out of this lock and through guard lock, about 300 yards distant, at 6.35.

Lock 9.—After passing through lock 8, tied up until 7.30 to allow the Rapids King and R. and O. passenger boat to pass. From this lock to lake St. Francis or Coteau Landing, a distance of 11 miles, is where the cards were taken. It has at the lowest estimate a current of $1\frac{1}{2}$ miles. There are two bridges and some construction plants fixing the canal bank. In and gates shut at 10.23.

Lock filled, gates opened and engine started at 10.35.

Lake St. Francis.

This lake is 28 miles long; has very little current except at a distance of about 4 miles from the west end, where it varies from 1 to 4 miles per hour. Arrived at Cornwall 2 a.m., Saturday, July 23. Here it was found that the third lock from here was broken (called 18), therefore tied up for the night, causing a delay of about 14 hours.

Cornwall Canal.

The total length of the Cornwall Canal is 11 miles, and the total elevation of the lockages, 48 feet.

Lock 10.—Under way again at 4.10 p.m. In lock and gates closed at 4.30. Some trouble in getting gates opened. Lock filled, gates opened and engines started at 5.25.

Lock 11.—About 250 yards straight ahead. In lock and gates closed at 5.35. Lock filled, gates opened and engines started at 5.47. After leaving this lock the ship tied up again, as the next lock was broken and it was not then repaired. Delay, 5 hours.

Lock 12.—About $7\frac{1}{2}$ miles distant. Two bridges, slight bend about half-a-mile after leaving lock. Left Cornwall 11.15, arrived broken lock at 12 midnight. In broken lock and gates shut at 3 a.m. July 24 (delay, 3 hours).

Lock 13.—About $1\frac{1}{4}$ miles distant, $\frac{3}{4}$ of a mile straight before entering lock. In and gates closed at 4.34 a.m. Lock filled, gates opened and engines started at 4.50.

Lock 14.—About $1\frac{1}{4}$ miles shallow water and crooked channel. In and gates opened and engines started at 5.45. Passed through guard lock at 5.55.

Lock 15 (Dickinson Landing).—About $7\frac{1}{2}$ miles, crooked but plenty of water. In fact, it is a branch of the river made into a canal by means of dams. One bridge. Arrived head lock. In and gates shut at 7.40. (Lift only 3 feet.) Lock filled, gates opened and engines started at 7.50.

Lock 16 (Farran's Point).—One lock, 800 ft.; lift, $3\frac{1}{2}$ feet. After leaving Dickinson's Landing there is a break-water about half-a-mile with a light on the outer end. Passed this light 8 a.m. From here to Farran's Point, a distance of eight miles, a boat is in a current of about a maximum of $4\frac{1}{2}$ miles. Engines slow at 8.35. This is the worst landing to make in the whole river, in fact, a captain would not make it at night with a loaded boat (14 feet). A swift current flows past the entrance of the lock, causing a miniature tide in the lock, and eddies between the current and the bank. There is a rise and fall at the

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lock of about eight inches in every ten minutes. In lock and made fast at 9 a.m. Waited for other two boats. Lock filled, gates opened and engines started at 9.40.

Lock 17 (Morrisburg).—Two locks, 11½ feet lift. After leaving Farran's Point there is a canal about one mile long. Clear of this at 10.10 a.m., and into the river and currents. Passed Weaver's Point at 10.40, the first bad point. Current estimated at 8½ miles. Passed the churches, the second bad point, at 11.20. Here a boat crosses from the south to the north shore, and, of course, loses some ground in doing so. From here to Morrisburg, a distance of about three miles, there is a current of between six and eight miles. Total distance from Farran's Point to Morrisburg 12 miles. Dorin's Point, just below Morrisburg, is about the swiftest current in this run. Slow 11.50. Tied up waiting for lock gate at 12.5. In lock, gates shut at 12.23. Lock filled, gates opened and engines started at 12.37. A boat having a speed of nine miles per hour could leave the head of Cornwall Canal, going around Farran's Point up to the Snye and land at Morrisburg. There is no time gained or lost in this, but it avoids a difficult landing at Farran's Point.

Lock 18.—Head lock; lift about 1 ft. About 4 miles distant; crooked with slight current. In lock and gates shut 2 p.m. Lock filled, gates opened and engines started at 2.10.

Lock 19 (Iroquois).—Two locks, 15 ft. elevation; 1,800 ft. long. From this lock it took 5 minutes to clear the canal. (2.15 p.m.) From here to Iroquois, a

distance of 7 miles, is in the river and currents. Passed Pine Tree Point at 2.45, which is as swift a current as there is in the river; the boat barely moved in the worst part, but it is only about 300 yards long. Slow 35, waited for another boat. In and gates shut at 3.30. Lock filled, gates opened and engines started at 3.55.

Lock 20.—About 7 miles distant; crooked at the eastern end and rocky bottom. Very few iron boats loaded venture through here at night. Two bridges. About two miles east of Cardinal there is a rough stone wall on either side. These are close together, as no boats pass down, all are up bound. In Galops Lock, gate shut 5.50. Lock filled, gates opened and engines started at 6.10. Soft bottom in this lock. A boat is not allowed to work her propeller until she is about half out of the lock. This is the last lock. After leaving the lock there is a canal about half a mile long, then the open river with a current of about 3½ miles for about a mile and through another canal called the "North Channel," about 1½ miles. Passed the western end of this 6.43 p.m. Prescott 5 miles at 7.20. From here along for about 20 miles is the Thousand Islands. Arrived at Oswego at 7 a.m., July 25. The distance from Prescott to Oswego is about 125 miles.—"Engineer" and "Journal" of Commerce."



STEAMER W. H. DWYER.

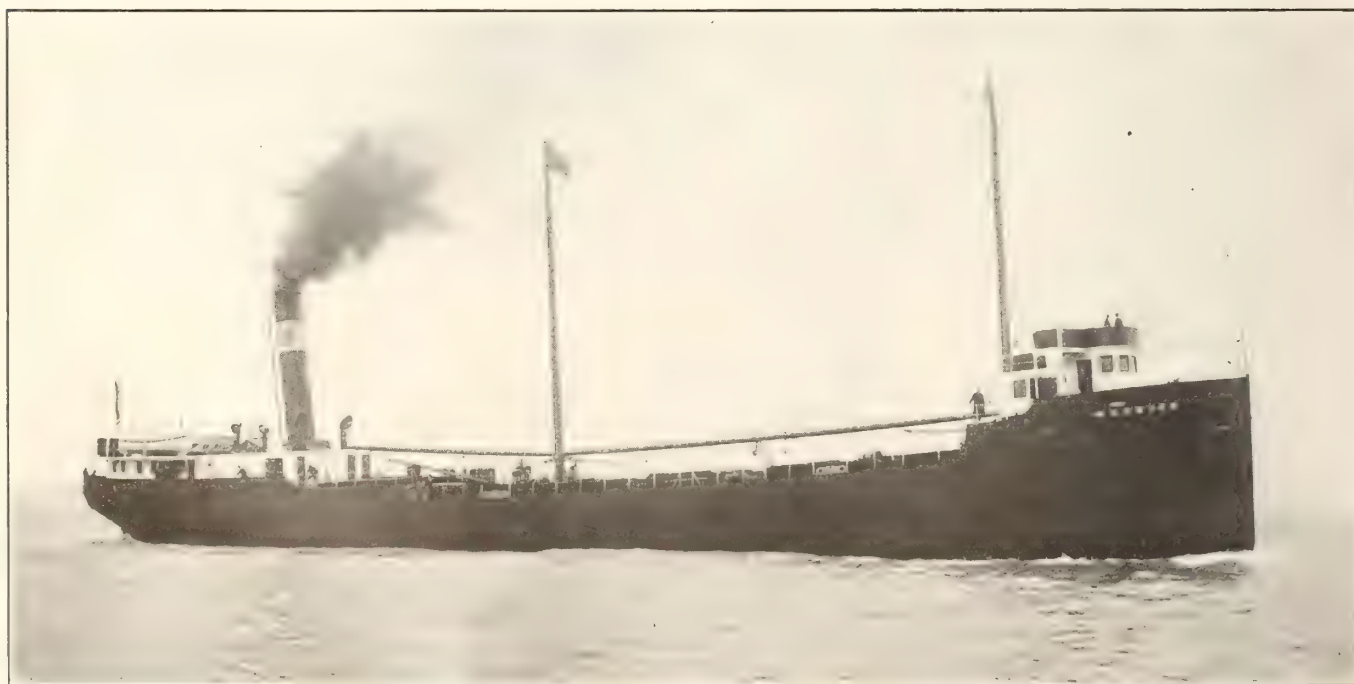
THE new steamer, "W. H. Dwyer," recently built for the Canadian Lakes service, by the Sunderland Shipbuilding

Co., takes the highest class of the British Corporation. Her principal dimensions are:

Length 257 feet, breadth 42 feet 8½ inches, depth 18 feet 6 inches. Deck houses are placed aft over the machinery, with sun deck above, and over the top-gallant forecastle is fitted a texas house. The vessel is fitted with clear holds for the carrying of grain in bulk, and is built with cantilever frames in order to dispense with pillars. Accommodation for captain and owner is provided in house on forecastle deck, and for officers and engineers aft, whilst the sailors and firemen are berthed in fore end of boiler room casing. The saloon is in a deck house at the after end, and is fitted up in polished hardwood. A complete installation of electric light is fitted, and all living rooms are heated by steam. The deck machinery consists of four steam winches, steam steering gear and direct steam capstan windlass. The vessel was built to the order of Dwyer & Hennessy, Ottawa, Ontario.

The propelling engines were supplied by MacColl & Pollock, Ltd., Sunderland, and have cylinders 17 in, 28½ in. and 46 in. by 33 in. stroke; steam being supplied by two large boilers working at a pressure of 185 lbs. per square inch.

The trial trip was in every way most satisfactory, everything worked well, and a mean speed of 10¼ knots was easily maintained. Mr. Dunlop, of John Reid & Co., naval architects, Montreal and Glasgow, who superintended the construction of the vessel, was on board, and expressed himself as thoroughly satisfied with the result.



NEW CANADIAN LAKES STEAMSHIP "W. H. DWYER."

A Board of Trade Steam Valve Chest Explosion Inquiry

The evidence furnished goes to show that "water hammer" was the cause of the explosion, and as the subject is one of more than usual interest to operative engineers, and, at the same time, highly educative, we are reproducing the data and illustrations submitted by the B. of T. Surveyor, which contributed so largely in helping the Court of Inquiry to arrive at a decision.

BY THE explosion of a steam valve chest on board the Royal Mail Steam Packet Co. liner, Araguaya while in dock at Southampton on March 10 of this year, three boiler scalers were killed, and three others were injured, through the escape of scalding steam. At the Board of Trade investigation which followed, it was found that the valve which burst had been correctly designed and constructed, that it was free from flaws, and that it had been properly installed. The cause of the explosion as determined by the evidence was shown to be "water hammer," a contingency brought about by the accidental opening of a drain cock. In his evidence, Mr. C. W. Roberts, Board of Trade Engineer Surveyor, said:

"I examined the fracture with a lens. There was no flaw to account for the failure. The metal at the fracture was solid, having no blow-holes, and of a fine granular structure. Water passed freely through the port of the drain cock, equivalent to that which would issue from an orifice of a $\frac{1}{4}$ in. to $\frac{3}{8}$ in. The strength of the valve chest cannot be determined with precision, but I estimate that the bursting pressure would be at least 1,600 lb. per sq. in., giving a factor of safety of $7\frac{1}{2}$. These are rough calculations. The chest must have received a very great shock, and I am satisfied it could have resulted in no other way except from water hammer action, the circumstances, in my opinion, being ideal for the production of water hammer, for this reason: The branch pipe to which the chest was secured had a horizontal portion, and then it rose abruptly, and this formation would cause water of condensation to be entrapped in this part of the pipe.

The Water Hammer Feature.

I have prepared diagrams to illustrate in six stages how water hammer was probably formed, from the time that the drain cock was open, shortly before the explosion occurred, assuming it was so open, to the time of the explosion. The outlines of these diagrams are, of course, the same. The chest is indicated in section, and with it is the branch pipe leading into a portion of the main auxiliary pipe. Actually, the pipes and the chest were not in the same vertical plane as shown in the drawings. This branch pipe, after branching from the main pipe, was bent round at right angles to the main pipe. Then the horizontal portion

was again bent round at right angles to meet the chest. In the diagrams, only the bend from the vertical to the horizontal portion is shown. It is shown as it is, so as not to confuse the issue. The conditions at the time of opening the cock, shortly before the explosion would be as represented in Fig. 1. The valve would be closed, and the chest, or portion of the chest above the valve, would be filled with water of condensation, as would also the branch pipe up to some level above the horizontal portion.

of course, being very gradual, and the pressure of steam within the pipe, acting on the surface of the water within the pipe, would gradually force the water into the upper portion of the chest, which had been previously occupied by steam, so that the chest would be completely filled right up to the cover.

Now, the conditions which obtained would be the same as in Fig. 1. The surface water would be at the same temperature as the steam. Elsewhere, the water would be comparatively cool, especially at the bottom of the pipe and

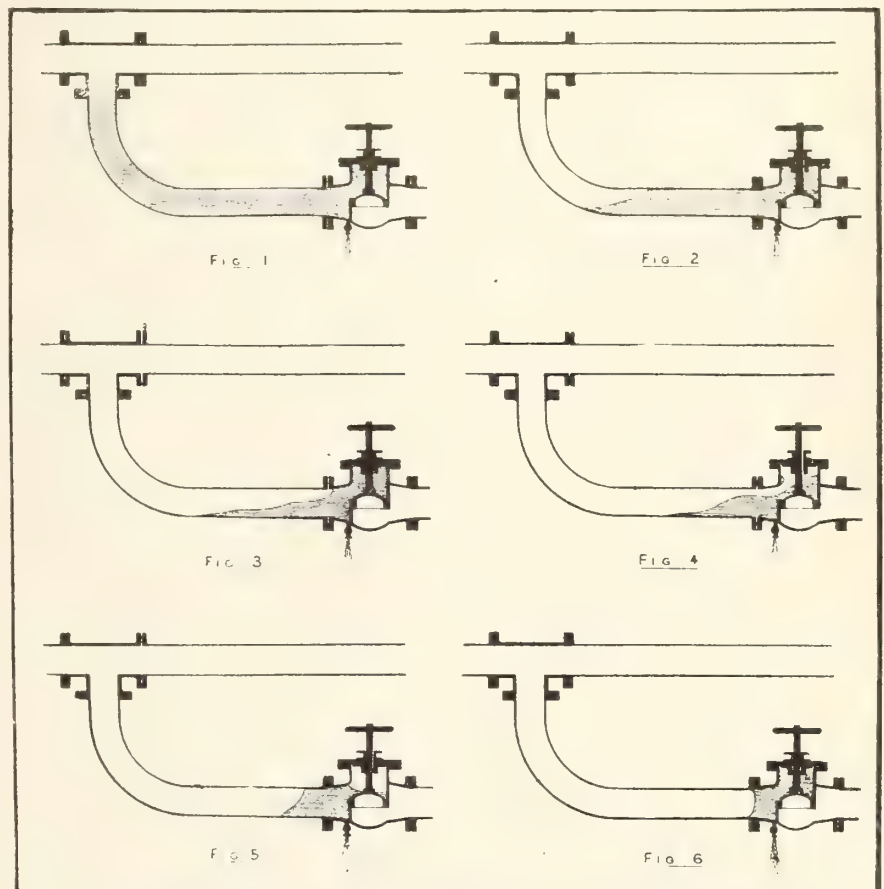


DIAGRAM SHOWING DISPOSITION TO "WATER HAMMER."

A point I wish to emphasize is this, that the neck of the chest would be completely filled with water, because, on the water draining into this pipe, and reaching the level of the top of the horizontal portion, steam would be entrapped in the chest. The sides of the chest and the surface water would be at the same temperature as the steam within the chest; but as the metal and water cooled down by radiation, the steam in the chest would be condensed, the process,

in the valve chest—in the positions most remote from the steam, and in which the water had been standing longest. On the drain cock being opened, the level of the water in the vertical leg of the pipe would gradually fall. The surface would remain unchanged as regards temperature and area until passing the first bend—that is the bend shown in the diagrams. On passing the first bend the surface would expand, the additional area being made up of cooler water—

that is, water that had been lying lower down in the pipe. On this cooler water being presented to the steam, condensation would occur.

The condensation would not be uniform over the whole surface of the water owing to the irregular temperature. The surface water would probably be cooler towards the inner radius of the bend of the pipe than towards the outer radius. This would result in the surface of the water no longer being level, but it would assume a more or less sloping position—as shown in Fig. 2—due to the irregular pressure on the surface of the water. The surface would be depressed where the water was hottest. Then, on the water continuing to be drawn from the pipe—steam would be admitted along the upper portion of the horizontal length. The process would be very gradual, because the drain cock was only partially open, so that the steam in its passage through the pipe would gradually heat up the water on its way. There would be no violent commotion of the water until the steam reached the valve chest. The position assumed by the water when the steam was at the entrance to the chest is shown in Fig. 3, and on gaining access to the chest the steam would displace the water which had been previously held up in the neck of the chest as shown in Fig. 4.

The Condensation Feature.

In falling by gravity the water would be suddenly agitated and would probably again block the pipe—as shown in Fig. 5. In blocking the pipe, steam would of course be imprisoned in the valve chest. This steam, on meeting the comparatively cool sides of the chest and the surface of the recently disturbed water would be suddenly condensed, and the block of water in the pipe would be propelled by the pressure of steam acting on its surface within the pipe into the vacuum caused in the chest, and it would strike the cover with enormous velocity—with sufficient force to fracture the neck of the chest, as I estimate. The ultimate position is shown in Fig. 6.

The length of the branch pipe to which the chest was attached scales about $7\frac{1}{2}$ feet on the drawing, that is, the pipe itself from flange to flange irrespective of the branch of the T-piece. To fill that pipe with water beyond the bend, there must have been rapid condensation of the steam between 6 and 10.45 a.m. on the day of the explosion. According to the evidence there appears to have been no preliminary sign of knocking before the explosion occurred. Several cases have come to my notice in which there was no knocking. Of course, it depends on the arrangement of pipes. If the length of the horizontal portion is great relative to the diameter, one might expect a knocking to occur, and the

rapidity with which the water is drained from the pipes has an important bearing on the subject.

The action is somewhat different when the steam is admitted to a long horizontal pipe in the lower portion of which there is relatively cool water. There is no doubt very rapid local condensation when steam is admitted, and it has been suggested that the steam in rushing through the restricted channel raises up behind it a wave which isolates the steam in the remote portion of the pipe, and this steam becoming suddenly condensed, the pressure wave is carried into the vacuum and delivers the water hammer blow; but it is incorrect to term the movement of this mass of water a "wave," which is a translation rather of form.

In all probability, the local condensation results in the sensible diminution of pressure at a particular place. This has the effect of heaping up the water at this particular place, due to the greater pressure elsewhere on the surface. The water is heaped up and, in assembling, is gathered up from the lower portion of the pipe. This exposes a fresh surface of the water to the steam, and the condensation is more rapid and causes a disturbance in other portions of the pipe. These heaps of water must oscillate owing to the irregular pressure. There is a violent agitation over the whole surface, which will continue so long as the temperature of the surface water differs from that of the steam.

For example, when steam is admitted into deck winch pipes in which there is water of condensation, they will almost immediately start to knock and vibrate, and this will continue until the pipes are thoroughly warmed up, or the water is expelled. The knocking is produced by the impact of the water against the side of the pipe as it fills the spaces left by bodies of steam on suddenly becoming condensed. This steam is entrapped or isolated by the water in the general commotion: it may be in the form of globules or in larger bodies separating blocks or plugs of water. The action of water hammer is in effect always the same. It is the movement of a mass of water by pressure on one side into the space occupied by lesser pressure on the other.

In my opinion, the valve chest was sound, and the failure was practically instantaneous, by reason of water hammer action. The whole of the theory that this rupture was brought about by water hammer action depends upon the fact that the drain cock must have been open prior to the explosion.

TOWAGE ACROSS THE ATLANTIC.

LIVERPOOL has long been noted for her fine fleet of tugs, and particularly for long and successful towages. At the

present time two tugs are engaged in foreign work, one being the Blackcock, which has sailed for Canada having in tow the coasting steamer St. George, which the Canadian Pacific Railway recently purchased from the Great Western Railway for coastal service in the Dominion. The steamer was recently built at Birkenhead for the Fishguard-Rosslare service and has a speed of about 20 knots.

CIVIL SERVICE BOARD TO CONTROL CHANNEL WORK.

IT is the intention of the Minister of Marine to have the branch of his department which has the supervision and management at headquarters of the St. Lawrence ship channel placed under the jurisdiction of the Civil Service Commission. When this policy has been put in force, appointments in the technical and engineering staff will be made after competitive examinations. In the meantime a decision of more immediate concern to employees of the Channel service has been come to, namely, an increase of ten per cent. in wages of firemen and deck hands on the tugs, tenders and dredges working on the St. Lawrence channel improvements.

FERRY STEAMER "PONTIAC" BURNED.

THE ferry steamer Pontiac was gutted by fire, said to have been of an incendiary origin, on the night of July 6, at the Grand Trunk docks, Toronto, causing a damage of \$6,000, partly covered by insurance. An attempt was made to burn the Pontiac last winter, but the firemen succeeded in subduing the blaze before it had a chance to gain headway. Two months ago the vessel sank, and had just been raised.

The boat had been lying on the waterfront for some time, and was recently rebuilt. About midnight, smoke was noticed coming from the wheelhouse by passing trainmen, and the alarm was rung in. By the time the fire department had reached the scene the fire had obtained a good hold on the boat, and as it was situated in a bad position for the men to reach, it was some time before the hose was carried aboard.

In the vicinity of the ferry was the steamer Frontier of the defunct Peoples Line, and a large cofferdam, valued at \$5,000, and several million feet of lumber. The good work of the firemen, however, prevented the blaze from spreading, although the dock, which is in a dilapidated condition and full of openings, endangered the lives of the fire-fighters.

The Pontiac is owned by John Smith of Rosedale. She formerly plied around Windsor and Detroit.

MARINE ENGINEERING OF CANADA

MOTOR ENGINES.

IN a former report, the attention of Canadian manufacturers was drawn to the trade with Newfoundland in motor engines. The passing of old methods of prosecuting the fisheries is evidenced by the surprising increase in the number of motor boats that will be employed in the Colony's staple industry this season.

There is at present scarcely a harbor around the coast but will have one or more boats this summer, and some of the principal ones as many as five or six. Besides being used for ordinary fishing purposes, motor boats are now employed in connection with various industries and other callings, such as lumber and pulp mills; for carrying mails; by clergymen in connection with their missions; by the medical profession; while for freighting and similar purposes large motor boats will soon be in demand.

About 2,000 boats propelled by motor engines are now in use around the coast, and already 300 engines of Canadian manufacture have been sold to fishermen by one firm since the beginning of the year.

NEW HYDROGRAPHIC SERVICE VESSEL "ACADIA."

THE "Acadia," a new ship, built for Hydrographic Service of the Dominion Government, recently arrived in Canadian waters. This vessel was built

in execution of a contract entered into between the Department of Marine and Naval Service of Canada, and Clarence I. de Sola, of Montreal, acting in conjunction with Swan, Hunter & Wigham Richardson, Ltd., the well-known shipbuilders of Wallsend-on-Tyne, who built the vessel in their Tyneside Yards, from designs furnished on behalf of the Canadian Government by R. L. Newman, their naval architect in Ottawa.

The "Acadia" is 170 feet long by 35½ feet beam, and has been built to attain the highest class Lloyds register. She is propelled by one set of powerful triple expansion engines, supplied with steam from two boilers working under Howden's forced draught system. On the trial trip the vessel attained a mean speed of 12½ knots, and in her passage across the Atlantic she upheld her record splendidly for speed, in spite of unfavorable weather, arriving in port ahead of the scheduled time.

The vessel is schooner rigged, and is built of steel, being strengthened with heavy plates to enable her to run through ice and work under all climatic conditions. She is very completely outfitted for hydrographic service work, being equipped with two special motor launches and Lucas sounding machine, marine sentry, sounding winch, electric light with projector, etc. In addition to the usual accommodation for deck and engine room officers there are a number of special rooms for the various officials engaged in survey work, all of which are handsomely furnished.

Altogether, the "Acadia" is a valuable addition to the Dominion Government marine service, and is excellently adapted for the special work for which she is intended. This is the second hydrographic vessel which Swan, Hunter & Wigham Richardson have contracted for and built in conjunction with Mr. de Sola for the Canadian government, the "Cartier," built three years ago, being the first.

NEW WHITE STAR LINER "BRITANNIC."

THERE are more watertight bulkheads in the new White Star Liner Britannic, building at Belfast, than were introduced into the Olympic. Perpendicular plating is to be found on the stern, which tapers out, considerable cargo space having been sacrificed by this arrangement. It is said that this space will be devoted to the storage of oil in bulk, so that, in the event of oil being partly used for fuel on the vessel, it can be led to the boilers in quick time.

A novel device for launching lifeboats will be introduced into the equipment of the liner. Invented by the builders, the mechanism is controlled by electricity from the bridge. When the officer on duty touches a button, a pin is forced out of the supports, and, at the same time, the boat is given sufficient momentum to send the davits out clear of the ship's side, the work of lowering into the water being then only a matter of a few moments.



CANADIAN GOVERNMENT NEW HYDROGRAPHIC SERVICE VESSEL "ACADIA."

STERN WHEEL TUG FOR HUDSON BAY.

THERE is being built at the Polson Iron Works, Toronto, a stern wheel tug to the order of the Dominion Department of Railways and Canals, for service on the rivers running into Hudson's Bay. Our illustrations represent 5 hours erection labor on the hull at the Polson plant. The dimensions of the vessel are as follows:

Length over hull and wheel, 117 ft.; length over hull only, 104 ft.; breadth, 18 ft.; depth molded, 4 ft.; draft aft, 2

above deck to form the bulwarks. The main keelson and centre truss consist of $\frac{3}{8}$ in. plate, 15 in. wide, with side keelsons of 6 in. ship channels from end to end. There are 3 transverse watertight bulkheads, 2 docking keels of 3 x 10 in. oak, and 4 x 8 in. oak wales secured by $3\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{1}{4}$ in. angles. Two balanced rudders of $\frac{3}{8}$ in. steel plate are being fitted. The hull will be put together in the builders' yard, and be afterwards dismantled and shipped knock-down to Hudson's Bay, aboard the dredge Port Nelson. The Polson



STERN WHEEL TUG FOR HUDSON BAY IN COURSE OF ERECTION.

ft. The framing is spaced at 15 in. centres, and consists of $2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{1}{4}$ in. angles throughout. The hull plating is of $\frac{1}{4}$ in. steel, while the stringer plate of $\frac{1}{2}$ in. steel extends around the ship and is connected to the shear plate by $2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{1}{4}$ in. gunwale bar. The shear plate extends 12 in. above deck to receive the cabin stanchions, and forward of the cabin, it extends 30 in.

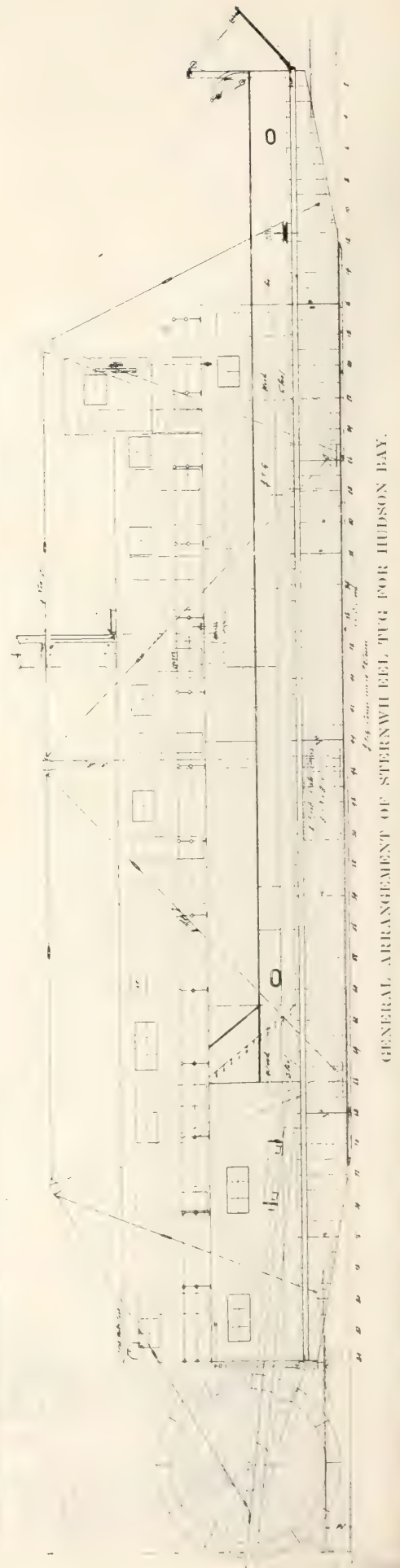
Co will furnish the labor necessary to put together and complete the tug at her destination. Ample and comfortable accommodation is being provided for the crew, and in the matter of general equipment, electric light, plumbing and steam heating systems are being installed.

Machinery.

The motive power consists of one



STERN WHEEL TUG FOR HUDSON BAY IN COURSE OF ERECTION.



GENERAL ARRANGEMENT OF STERNWHEEL TUG FOR HUDSON BAY.

MARINE ENGINEERING OF CANADA

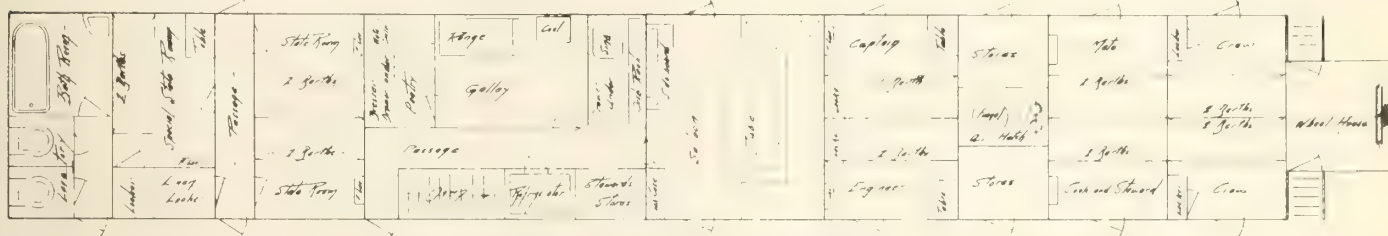
pair of stern wheel engines, with cylinders of 12 in. diameter by 48 inch stroke, and a locomotive type boiler, 56 in. diameter by 20 ft. long, for a working steam pressure of 160 pounds per sq. inch. Two outside packed $5\frac{1}{4} \times 3 \times 6$ in. pumps for boiler feed and general service, a National feed water heater and two double barrel type capstans with 6×8 in. double cylinder reversing engines form part of the auxiliary machinery equipment.

are not in a position to make a statement as regards our intentions." The land in question is near the Grand Trunk elevator.

It is generally believed in shipping circles that the Commission wish to build new sheds, as the accommodation for grain vessels in the port is felt to be insufficient. According to the terms of the lease which the companies are said to hold, the Government, on giving two months' notice, can reclaim the

Trade that, as larger vessels are being placed on the St. Lawrence route, the work of dredging the channel ought to be advanced with as little delay as necessary.

It is estimated that eighteen million yards of material must be taken from the channel between the Isle of Orleans and Goose Cape in order to obtain a uniform depth of 35 feet in a channel 1,000 feet wide. So far, 3,000 000 cubic yards have been taken out, and it is ex-



DECKHOUSE PLAN OF STERNWHEEL TUG FOR HUDSON BAY

MONTREAL HARBOR COMMISSIONERS VISIT OTTAWA.

THE exact object of a visit made by W. G. Ross and Farquhar Robertson, of the Montreal Harbor Commission to Ottawa recently, where they were in conference with the Hon. J. D. Hazen, Minister of Marine and Fisheries, has not been disclosed.

Although a despatch from Ottawa states that the Commissioners were in the Capital with the object of obtaining some 60,000 square feet of land near the Lachine Canal, which is now leased to private firms, Mr. Ross chairman of the Harbor Commission, declined to make an affirmation, although he said

land for its own purposes. Mr. Ross' refusal to make a statement is looked upon as an admission that this clause of the lease will be acted on, but it is thought that the Commissioners wish to delay plans for what new accommodation will be necessary until final permission is secured from the Government.

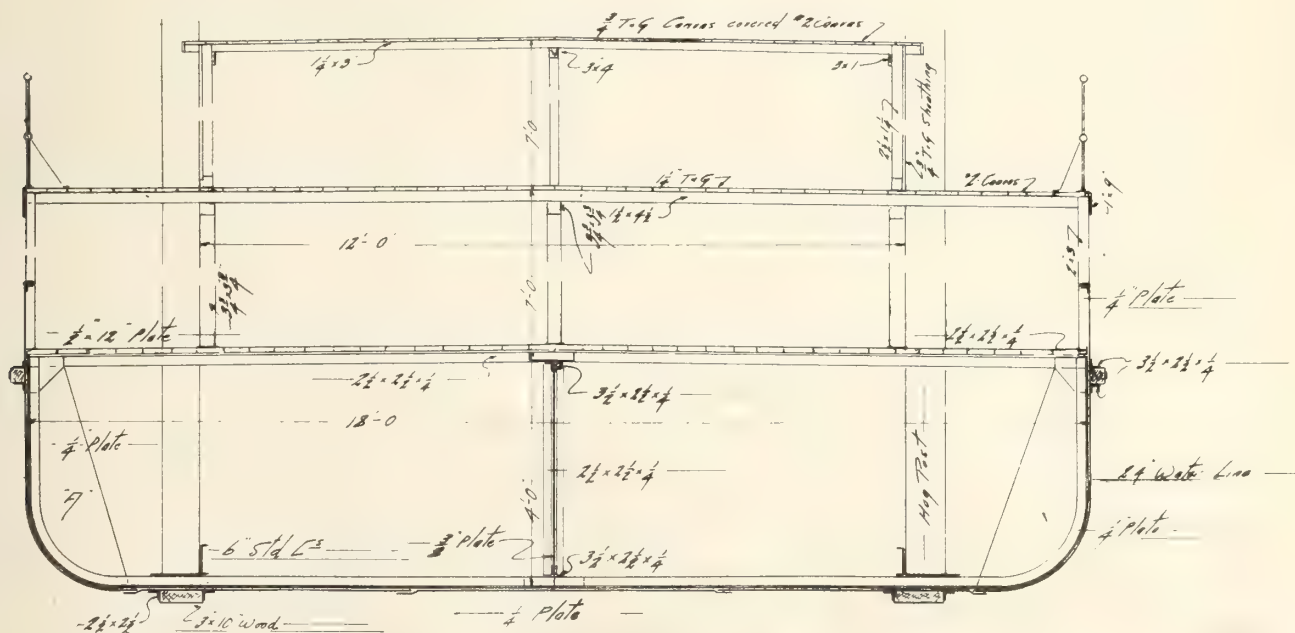
DREDGE TO IMPROVE ST. LAWRENCE CHANNEL.

AN additional dredge will shortly be placed in the north channel of the St. Lawrence, below Quebec, by the Department of Marine and Fisheries, with

pected that the dredging of the remainder will be finished in four years.

HALIFAX AND WEST INDIES
SERVICE.

NEGOTIATIONS which are in progress for first-class steamships for the Halifax and West Indies service have not yet resulted in their being secured, but, in the meantime, four ships are engaged, and there are sailings every twelve days, as called for by the contract. Two larger vessels will be in commission shortly. It is yet too early accurately to gauge the trade development to result from the new agreement between Canada and the West Indies.



MIDSHIP SECTION OF TUG FOR HUDSON BAY

he could not deny the statement. "The information was probably given out by the Government," he said, "but we

the object of hastening the work of deepening the channel. Representations have been made by the Quebec Board of

but the Department at Ottawa is well pleased with the showing made since the treaty came into force.

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Vol. III

JULY, 1913

No. 7

WRECK COMMISSION AGAIN IN THE SPOTLIGHT.

IN a recent issue we had occasion to record the repeal of the certificate suspension sentences pronounced by Wreck Commissioner Lindsay on the masters of the steamships Royal George and Bengore Head. The decision of another such Court of Inquiry has since come to grief, to wit, the certificate suspension passed on the master of the steamship Bellona.

Before the President and Justice Bargrave Deane in the Admiralty Court Division, Captain Cunningham's appeal against his sentence of 3 months' suspension, was heard recently, with the result that the officer's character was completely vindicated, and his certificate returned him as from the date of suspension, December 5, 1912. The facts of this particular case are as follows.

The Bellona, outward bound, last October, went ashore in the St. Lawrence. The master, feeling unwell, had gone below, leaving instructions with the pilot and a deck officer that he was to be called if necessary. Some time after, the mate of the Bellona noted a move so incomprehensible, as to make him hazard the question to the pilot; are we going back to Quebec? The rudder had been put hard aport, and the vessel had swung round and was heading S.S.W. The mate's query had the desired effect, with the result that the vessel was put back on her proper course again, of N.N.E. That officer's confidence in the pilot had naturally vanished, and fearing a repetition of such fantastic manoeuvres, he called the Master. Ere they reached the bridge, the S.S.W. course was again being steered, and, although Captain Cunningham, on grasping the situation, took charge of the ship, he was too late to prevent her going ashore.

The Wreck Commission Inquiry held at Quebec, while admitting that the pilot was responsible for the stranding, found the Master of the Bellona at fault because of his having gone below, leaving an officer inexperienced in navigating the St. Lawrence on the bridge. The most

heartless, because inhuman feature of the decision dealing with the certificate, is that which dubbed Captain Cunningham's sickness as not being such as to incapacitate him from attending to his duties as master.

Ye gods! If the fate of recent Wreck Commission inquiries in the St. Lawrence district are not of sufficient moment not only to incapacitate but to make Wreck Commissioners there, seek private life, then what will. Captain Cunningham had been continuously on duty for 15 hours, when he left his officer in charge with the pilot, and as regards the unimportance of his sickness, a subsequent paralytic stroke, was, according to medical evidence, most probably manifesting itself at the time of the Bellona stranding.

The matter of the mate's lack of knowledge of the St. Lawrence is too silly to be taken seriously, and simply goes to show how utterly unable those presiding at the Inquiry were to discriminate between justice and injustice. An officer subordinate to the master may be, and is, oftentimes on an unfamiliar route, and if he were unable to take charge, it might be that the master himself would have to without intermission. Again, masters themselves would, according to the Wreck Commission Court's reasoning, be unfit to take command, when navigating a new route.

Casualties on the St. Lawrence have got enhanced publicity through the proceedings relative to overturning Commissioners' decisions, and have, we are afraid, drawn unnecessary attention to failings inherent in the whole system by which navigation is regulated there.



DIESEL-ELECTRIC VESSEL PROPULSION.

CONSIDERABLE space is devoted in this issue to the subject of the propelling machinery for lake, river and canal freighters, with a view to furnishing our readers with a record of the steps being taken to develop this feature, as disclosed in the paper read before the Institution of Naval Architects, recently. We believe we are right in saying that those responsible for the safe navigation and machinery handling of this particular type vessel, are unanimously in accord with the opinions expressed by the authors of the paper.

The outlook, for the Diesel engine of itself usurping the place of the triple expansion steam engine is not particularly bright, even under the most favorable circumstances, and after a perusal of the actual logs of vessels in service, without the more or less trying personal experiences of canal freighters' officers and crew, one has little difficulty in discerning little in the Diesel engine alone, for such work. Whether the new type propelling machinery will achieve all that its sponsors claim and hope for, remains to be seen, but one thing, however, is clear and conclusive—that they have a thorough grasp of the conditions to be met,

To the members of the Institution of Naval Architects, the Paper will reveal existent conditions on our inland waterways, for the most part, hitherto undreamed of, and will awaken, we believe, an interest in this sphere of naval architecture and marine engineering, which will lead to investigation and research, whose ultimate result will be towards a higher degree of achievement in lake and canal vessel machinery equipment.

The advent of the ship now building in the Old Country, and her service record will be matters of more than ordinary interest to all sections of marine men throughout the Dominion, and while nothing immediately revolutionary may be anticipated, there are apparent all the elements of such initial attainment as will make ultimate success available.

MARINE NEWS FROM EVERY SOURCE

Point Edward, Ont.—The plant of the Point Edward Elevator Co., near Sarnia was destroyed by fire July 7 at a loss of \$350,000.

Vancouver, B.C.—The British cruiser New Zealand has arrived at this port. The city will hold an official reception on July 28th.

Levis Drydock Contract—The contract for the new drydock at Levis, Quebec, has been let to M. P. & J. T. Davis, Levis, at a price of \$2,721,116.

Toronto, Ont.—The R. & O. Navigation Co. have abandoned the \$1,000,000 dock project owing to the new viaduct plans for Toronto.

Coburg, Ont.—The work of extending the west pier at the harbor is being proceeded with, and the first crib has been launched. Two tugs were required to pull it off the ways.

Montreal, Que.—It is reported that the harbor commissioners of Montreal propose to increase the length of some of the piers in the harbor, by 250 ft. to furnish accommodation for more steamers

Sydney, C.B.—H.M.S. Cumberland, Captain Smith, R.N., while coaling at Sydney preparatory to leaving for England, took on board 1,500 tons of coal in one hour at the Dominion Coal Co.'s new coaling plant.

Ottawa, Ont.—The Hydrographic Survey Department is advised that the Boethic, ashore at Point Rich, was pulled off the rocks on the evening of July 22.

Selkirk, Man.—It is probable that the Dominion Government will have a railway drydock built and located at Selkirk, Man., for the use of vessels navigating the Red River and Lake Winnipeg.

Increase of Pay—The Minister of Marine and Fisheries, Hon. J. D. Hazen, has put through an increase of ten per cent. in the pay of the firemen and seamen employed on the St. Lawrence ship channel fleet.

Port Colborne, Ont.—The Government elevator here established a world's record on July 23, by discharging the steamer Emperor, from Fort William

with 350,000 bushels of wheat, in the remarkable time of eleven hours.

Vancouver, B.C.—Announcement is made that the new harbor commission of Vancouver is to consist of F. Carter-Cotton (chairman) and James A. Fullerton and Sam McLay.

Halifax, N.S., July 16.—The crew of H. M. C. G. S. Niobe are making preparations for departure. Twenty intended leaving for Montreal on July 15, but were detained and will not likely go until a week later. Other detachments will leave shortly afterwards.

Victoria, B.C.—Two Grand Trunk Pacific steamers are now on the regular run between Victoria, Vancouver with a call at the Queen Charlotte Islands en route. The company anticipates a tremendous rush of tourists over this popular route this summer.

Montreal Harbor Revenue—From the official returns of revenue of the port, issued by the Secretary to the Harbor Commissioners on July 4, an increase of over \$13,000 revenue, as compared with June, 1912, is disclosed. The Collector of Customs reports revenue from imports \$40,000, and from exports \$19,000, as against \$37,000 and \$14,000 for June, 1912; a total increase of \$8000.

Steamer "Ionic."—The steamer Ionie, of the Northern Navigation fleet, has been changed some in her appearance since she was taken to Collingwood, where new boilers were installed, as ordered by the Canadian inspectors. Before the changes were made, the boat was a two-stacker, but is now equipped with one only. There are only two or three of the old two-stack variety left on the lakes.

The Polson Drydock.—Two thousand tons of steel for the new drydock to be built at the Polson shipyards have arrived but the company will not be able to start work until the site for its new plant has been selected. A change is being made as a result of the revised plans agreed upon by the railway companies for the esplanade viaduct, which will take in a portion of the property of the Polson Company.

Canal Record Broken.—Every previous record of the Montreal harbor and

Lachine canal was smashed in the month of June. The canal grain record was 2,000,000 bushels in excess of that for the previous month. The amount that came down the canal during June was as follows: Wheat, 4,070,532 bushels; corn, 7,000,000 bushels; oats, 2,201,444 bushels; barley, 480,289 bushels; flax, 772,475 bushels; rye, 96,000 bushels; flour, 45,936 bags; eggs, 5,067 cases; cheese 37,548 boxes, and apples, 41 bbls.

M. Beatty & Sons, Welland, Ont., have just concluded arrangements whereby H. W. Petrie, Ltd., will represent them in the cities of Toronto, Hamilton and adjacent territory. A complete stock of standard size hoisting engines, clamshell buckets, centrifugal pumps, derriek irons, etc., will be carried at the Toronto warehouse of Petrie, Ltd., which will enable them to fill orders promptly for Beatty material handling equipment.

Montreal, Que.—The extension of all the piers in the harbor undertaking which may cost over \$1,000,000, and which will consume the greater part of three years, is to be assumed by the Harbor Commissioners, according to an announcement made at the offices of the board on July 9. For several seasons complaints have been laid by the shipping companies and others interested that great inconvenience and often danger has been incurred by ocean-craft jutting out beyond the end of the piers. Several times this year, collisions, which only a good fortune saved from being serious, have occurred.

Saute Ste. Marie, Canal Record.—For the second time this year, all previous records for one month's commerce through the American and Canadian canals at Sault Ste. Marie has been broken by the showing made in June, when freight carried through the waterways aggregated 12,113,613 tons. These figures, given in the statistical report compiled by Superintendent L. C. Sabin, under direction of Lieut.-Col. Mason M. Patrick, district engineer, compare with a freight movement of 11,376,195 tons in May this year, and with 10,747,159 tons in June, 1912. The amount is nearly as great as the freight movement for the entire season of 1894, when the total

traffic through the canals was 13,195,860 tons.

Rapid Cargo Discharge.—The Dominion Coal liner "Hochelaga" recently accomplished a good performance at the company's towers at Windmill Point, Montreal. With 5 two-ton hoppers working, about 350 tons of coal were discharged per hour, including time allowance for turning.

Drydock at Levis, Que.—What is claimed to be the world's largest drydock accommodation at Levis, Que., for the largest ocean liners, is about to be constructed as the first of a series of drydocks and ship repair plants under contemplation by the Department of Public Works. Others will be located at Esquimalt and Vancouver on the Pacific, and Sydney, St. John or Halifax on the Atlantic. The contract has just been awarded for the Levis drydock, the cost being \$2,721,116, construction to be commenced at once, and to be ready for use in 1915.

Vancouver, B.C.—Early next month the Russian volunteer fleet will inaugurate a service between Vladivostok, Victoria, Vancouver, Tacoma and Seattle. Outward the shipment will consist mainly of Soya beans and other Siberian and Manchurian products, while homewards agricultural implements and general manufactured products will be carried. Russian immigrants to Canada and the United States are to be conveyed at low rates, including specially reduced fares from Europe over the Trans-Siberian Railway. The settlement of Canadian or American farmers and manufacturers in Siberia will be encouraged.

VESSSEL ARRESTED.

THE strong hand of the Canadian law was laid recently upon the steamer Wallula, which is owned by no less distinguished a person than C. W. Morse, popularly known across the border as "the Ice King" and as the financial magnate who had to spend a considerable time behind penitentiary walls.

The authorities of the Admiralty Court in Montreal are no respecters of persons, and when the charge was laid that the Wallula, owned by the "Ice King," was stealing into the Lachine Canal without paying her towage fees, action was prompt, the vessel being immediately placed under seizure, and a big placard affixed to her sides by a marshal of the court.

The steamer under seizure is one of three steel craft which have been operating in the Great Lakes on behalf of C. W. Morse, and which are now being

brought through the Canadian canals to go into the coasting trade between New York and Florida. The Wallula was the last of the three vessels to pass through, when her voyage was interrupted.

Many complaints are made regarding American craft stealing past Montreal without paying their dues. Last summer an American revenue cutter coming down from the Great Lakes was actually arrested, according to the nautical term, and many yachts of famous American millionaires have been treated in the same manner.

GEORGIAN BAY CANAL COMMISSION.

A ROYAL Commission will be appointed to investigate the commercial advantages of the Georgian Bay Canal project. Whether the Government will proceed with a 22-foot waterway from Montreal, through to the head of the lakes via the Ottawa River and the Georgian Bay, or whether it will proceed to deepen the St. Lawrence Canal to a depth of 22 or possibly 35 feet will depend upon the report of the Commission.

HUDSON BAY STEAMER MOVEMENTS.

THE first of the Hudson Bay steamers to sail for northern waters this season will be the Nascopic, which is now at Montreal. The Nascopic is commanded by Captain Meikle, who is making his first trip to Hudson Bay and James Bay, but he is taking with him a master mariner who has frequently voyaged there, and who is well qualified to act as pilot whenever required. The Nascopic is taking a full cargo of stores for the Bay ports, as well as 10 passengers.

After clearing from her berth at Windmill Point, the steamer will proceed, without stopping at Quebec, to Cartwright, on the Labrador, where she will meet the Pelican from London. Some of the Pelican's stores will be transferred to the Nascopic, and some of the Nascopic's to the Pelican, after which the latter steamer will proceed to Ungava Bay, and the Nascopic to Churchill and other ports on the shores of Hudson Bay and James Bay. The Beothic was the first boat to leave Montreal on this trip last summer.

SHIPPING RETURNS.

THE shipping returns for both Vancouver and Victoria have shown big increases in tonnage during the past

year. For May, the shipping in and out of Vancouver exceeded all previous records and established a mark which local shipping men believe will require some beating. During last month, the net register tonnage of ships coming to this port amounted to 91,339 tons, and this does not include the tonnage of the regular coasting steamers. In the month of April, the net inward tonnage was 81,199 tons, of which 38,634 were British and 42,565 foreign. The outward net tonnage for April was 80,286, as compared with 72,904 tons for the month of May. The figures for the port of Victoria are not available at the moment of writing, but from statements of previous months, that port is doing more business this year than at any other time in its history.

HUDSON BAY FISHING INDUSTRY.

PROFESSOR J. B. McCarthy, of King's College, Windsor, N.S., one of the most noted biologists on the continent and a great fish expert, has been selected by the Dominion Government to study this summer the commercial possibilities of the fishing industry in the Hudson Bay. It is the belief of the Minister of Marine and Fisheries that there is a splendid opportunity for the development of a big industry on Hudson Bay with the opening of the new railroad.

Prof. McCarthy will go north on a new steamer which has been chartered in England by the Naval Service Department, and will leave shortly with a party to carry on hydrographic surveys in the bay and straits to prepare channels for navigation as soon as the steel reaches Port Nelson.

The Bonaventura and the Bellaventura, chartered by the Government to take men and supplies to Port Nelson, have sailed from Halifax. They have on board one hundred men, and before the summer is over, it is expected to have 250 in camp. These two boats were loaded with supplies, which include lumber for building camps and general construction. During the season several million feet will be taken north. There will be a construction plant taken to the bay which will be sufficient to erect piers and breakwater and to get the harbor work well started.

Wages Increase.—Nova Scotia Marine Engineers have been granted an increase in wages, from 10 to 15 per cent, by steamship owners through the Province. The demand was made through the National Association of Marine Engineers last March.

FLOATING CRANES FOR PANAMA CANAL.

THE Secretary of War has authorized award of contract for two floating cranes of the revolving type of 250 gross tons capacity each, to the Deutsche Maschinenfabrik A. G., of Duisburg, Germany. There were four

ceived. The time of delivery for the two cranes is 580 days. They will, of course, be constructed in Germany, and a force is now being organized to take charge of the inspection at the works of the contractor.

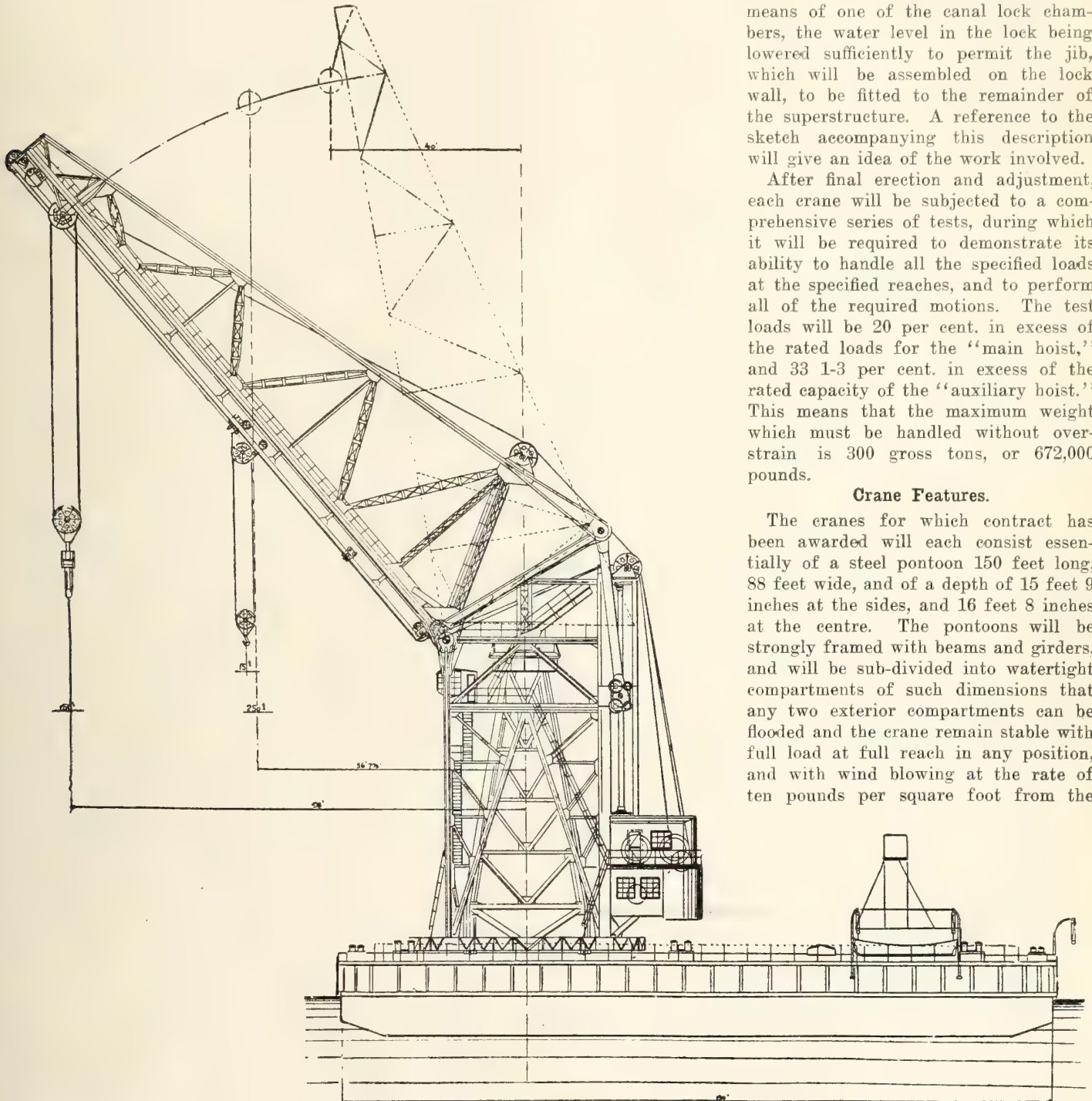
The pontoons will be designed and built at the German shipyard, simul-

structure will be shipped to the Isthmus in a knocked-down condition, final erection of the superstructure and placement of machinery parts being made after arrival on the Isthmus. The cranes are so high, and the weights of the superstructure are so great, that the erection of the jib or arm which carries the loads will probably be effected by means of one of the canal lock chambers, the water level in the lock being lowered sufficiently to permit the jib, which will be assembled on the lock wall, to be fitted to the remainder of the superstructure. A reference to the sketch accompanying this description will give an idea of the work involved.

After final erection and adjustment, each crane will be subjected to a comprehensive series of tests, during which it will be required to demonstrate its ability to handle all the specified loads at the specified reaches, and to perform all of the required motions. The test loads will be 20 per cent. in excess of the rated loads for the "main hoist," and 33 1-3 per cent. in excess of the rated capacity of the "auxiliary hoist." This means that the maximum weight which must be handled without overstrain is 300 gross tons, or 672,000 pounds.

Crane Features.

The cranes for which contract has been awarded will each consist essentially of a steel pontoon 150 feet long, 88 feet wide, and of a depth of 15 feet 9 inches at the sides, and 16 feet 8 inches at the centre. The pontoons will be strongly framed with beams and girders, and will be sub-divided into watertight compartments of such dimensions that any two exterior compartments can be flooded and the crane remain stable with full load at full reach in any position, and with wind blowing at the rate of ten pounds per square foot from the



250-TON CAPACITY REVOLVING TYPE FLOATING CRANE FOR PANAMA CANAL.

bidders—one American, one English, one Dutch, and one German, but the proposal of the German firm was so much lower in price than any other, and the experience, facilities, and reputation of this firm were so excellent, that it was unquestionably the best of those re-

taneously with the design and fabrication of the superstructure and operating machinery at the contractor's works in Duisburg. The pontoons, after being fitted with a part of the machinery located below deck, will be towed to the Isthmus, and at the same time the super-

most unfavorable direction. The pontoons will contain a power generating installation, consisting of a Scotch marine steam boiler, supplying steam to marine type engines driving the main and auxiliary electrical and generating units. These units will furnish direct

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals who Have Been More or Less Prominent in the Marine Sphere

William Nick Rodan, general manager of the Allan Line, London, England, was married to Janie, younger daughter of Archibald MacNeilage, of Gourrock, Scotland, recently.

Captain Walsh, Marine Supt. of the C. P. R. Atlantic Steamship Lines, will probably be transferred from Montreal to Liverpool. It is expected that he will leave Montreal about September 1.

Alex. Johnston, Deputy Minister of Marine; Col. Anderson, Chief Engineer, and J. G. McPhail, Commissioner of Lights, have gone down the Gulf to Belle Isle on an inspection of light-houses.

Capt. Wotton, of the C. N. R. liner "Royal Edward," has invented an apparatus for launching lifeboats from ships. At a recent demonstration before the British Board of Trade two boats, successively, were put out and launched in twelve minutes.

FRENCH CRUISER "DESCARTES."

THE French Cruiser Descartes, under command of Capt. Pugliesi Conti, has been visiting Quebec and Montreal. The Descartes has been stationed in the West Indies and on the South American coast during the winter, while during the fishing season it patrols the coast of Newfoundland to protect the rights of the numerous French fishermen, who annually go here for the season to fish on the Grand Banks.

The Descartes is listed as a second class cruiser of four thousand tons displacement, carries 22 guns, mostly ten and sixteen centimetre, and has a complement of 15 officers and 360 men. She was launched nineteen years ago, and took an active part in relieving the legations at Pekin at the time of the

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

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George Bourret, Sorel, P.Q., Grand Door-keeper.
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Boxer rising in China. A detachment from the ship formed part of the relieving force, and the cannon used on the march are preserved on board as memorials of that occasion. Since leaving France on the first day of February last year, she has traveled upwards of forty-eight thousand miles in American waters.

She will return to the Newfoundland coast for about a month before leaving for France on 1st of September. This is not the first visit the Descartes has made to Canada, as last year, she came to Quebec, and stayed for a few days.

HAMBURG-AMERICA LINE S.S. "VATERLAND."

FURTHER particulars of the Vaterland, recently launched for the Hamburg-America Line, have been issued. The dimensions are now stated to be:

Length between p.p. 905½ feet, beam 100 feet, height to main deck 63 feet. The number of decks will be eleven, the main deck being the sixth from the bottom. The highest point of the funnel will be 197 feet above the water line, and the masts 249 feet. The launching weight was 32,000 tons.

The propelling machinery consists of turbines, to which steam is supplied by water-tube boilers. The four turbines for steaming ahead can either be driven in series or separately, and their contract power exceeds 61,000 effective horse power at 180 revolutions per minute. The astern turbines can also be worked separately. The daily consumption of coal will be about 900 tons.

Accommodation will be provided for 750 first-class passengers, 600 second-class, 1050 third-class, and 1900 steerage. The crew comprises 1200 officers and men, including 340 stokers and trimmers. Boat space will be provided in excess of requirements.

Directory of Subordinate Councils for 1913.

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Collingwood,	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
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Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault S. Marie,	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown,	15	J. F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottetown, P.E.I.
Twin City,	16	Arthur Abbey	Port William, Ont.	John A. Smith,	Port William, Ont.

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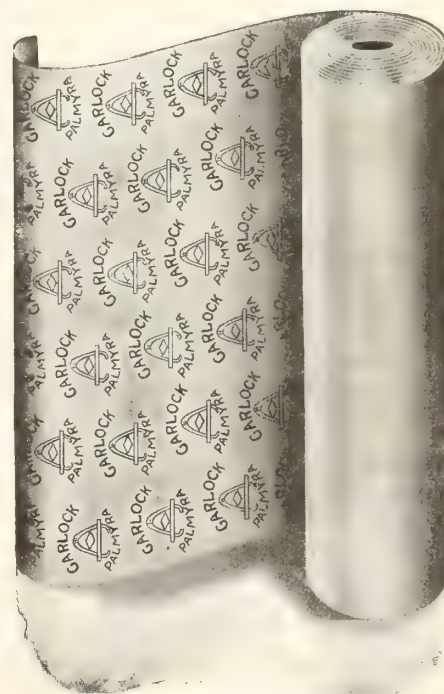
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on the superstructure, which latter will drive the wire ropes actuating the blocks to which the loads to be handled will be attached. The cranes will not be self-propelling, but the pontoons are fitted with towing bitts, etc., so that they can be handled by tugs. Each pontoon is fitted with four steam capstans, one near each corner, whereby the cranes can be manoeuvred to any desired position. To safeguard the cranes in possible heavy weather, or other circumstances, each is provided with two 3,000-pound anchors and the necessary chain cable, two steam anchor winches being provided for each crane to handle the anchors.

The pontoon supports the fixed and revolving superstructure at a point 39 feet distant from one end midway of the width of the pontoon. Reference to the accompanying sketch will give an idea of this superstructure. In general, it consists of three parts:—First, the fixed superstructure or mast, consisting of a four-sided truncated pyramid firmly secured to the pontoon framing; second, the revolving "bell" which is a four-sided, steel framed structure supported by a combination collar and roller bearing on top of the mast; and third, the arm or jib which is supported on the bell by two hinge pins, and is capable of motion about these pins, the motion being imparted to it by means of two links connecting it to two cross-heads situated at the rear of the bell, and actuated by two vertical screw spindles driven from the machinery house. The bell supports the machinery house, which is situated, as shown in the sketch, at the rear of the former, and a short distance above its bottom. This machinery house contains fixed counterweights, as well as the motors, gears, drums, etc., for operating the main and auxiliary hoists. The bell also supports the driver's cab at a point just below the hinge pins of the jib, from which the operator commands an unobstructed view of the entire field of work.

The bell terminates at its bottom on a circular steel girder carrying rollers, which press against a roller path secured to the mast. The motors for revolving the bell and jib around the mast are fixed at the bottom of the mast, and drive gears engaging a circular rack on the annular girder forming the base of the bell. All motions are in the complete control of one man whose station is in the driver's cab. In addition to the driver, there will be required a machinist in the machinery house on the bell, another machinist in the generating plant in the pontoon, and a fireman for the boiler; thus, with the exception of the deck force for handling lines, etc., but four men are necessary for the operation of each crane.

From the foregoing description of the superstructure, it will be seen that the entire revolving weight rests on the top of the mast and that the jib is prevented from overturning by the resistance of the collar bearing at the top of the mast, and the rollers at the bottom of the bell. The clearances are such that no part of the revolving superstructure, except the jib, overhangs the pontoon in any position, thus rendering it possible to operate the crane in restricted spaces. The heights of the superstructure are such that unencumbered passage around it is provided in all positions.

Hoist Features.

The jib is provided with two hoists designated the "main hoist" and "auxiliary hoist," respectively. The main hoist is fixed at the point of the jib and will consist of two equal blocks, each of a rated capacity of 125 gross tons. These two blocks can be linked together by means of an "equalizer bar," whereby they may be made to form substantially one hoist of 250 tons capacity. Each block of the main hoist will be suspended in ten parts of two-inch wire rope.

The auxiliary hoist will have a rated capacity of 15 gross tons, and will consist of a two-part block swung from a traveling trolley on a runway secured to the lower side of the jib in such a manner that the auxiliary hoist can be operated at any point of this runway at any position of the jib.

The main hoist can handle its rated loads at any point in a full circumference of 360 degrees with the mast as a centre. It can revolve completely under maximum loads, and can, in addition, be luffed in or out by means of the already mentioned links and screw spindles. The main hoist will have the following capacities at the reaches stated; by "reach" is meant the horizontal distance from face of pontoon fender to centre of block:

	100 Tons. Ft.	150 Tons. Ft.	250 Tons. Ft.
Loaded reach over end.	80.1	59.0	21.0
Loaded reach over side.	81.6	62.4	22.3

From any of these reaches the main load can be luffed in sufficiently far to enable the crane to deposit the load on its own deck.

The time of hoisting main loads is as follows:

Tons.	Per Minute.
250	3 ft. 6 in.
125	7 ft.
62.5	14 ft.

The unloaded blocks are raised or lowered at not less than 20 feet per minute, and the crane can make one complete revolution in from 5 to 8 minutes, depending on the load and wind,

the lower figure being for the most favorable condition without wind. The jib, loaded with 100 tons, can be luffed in from its maximum to minimum reach in not more than 17 minutes, and luffed out in not more than 13 minutes. Without load, the jib can be fully luffed in from maximum to minimum reach in not more than 10 minutes, and luffed out in not more than 8 minutes. The speed of hoisting the fully loaded auxiliary block will be not less than 40 feet per minute, and the unloaded auxiliary block can be raised or lowered at no less than 80 feet per minute. The speed of trolleying the auxiliary hoist along its runway will be from 40 to 80 feet per minute, depending upon the degrees of inclination of the jib.

Pontoon Features.

Each crane will be safely stable in a wind exerting a pressure of 40 pounds per square foot, even with full 300-ton deck load on the pontoon. The pontoon will have a freeboard of not less than 3½ feet when handling maximum capacity loads in any position without deck load; if the deck load be present this free load will be reduced to not less than 2 feet. The maximum longitudinal inclination of the pontoon will not exceed 2½ degrees, and the maximum transverse inclination will not be greater than 5 degrees.

Each crane will be provided with ladders, stairs, gangways, etc., for convenient communication, inspection and repair, and will be fully equipped with all necessary signals and means of communication. Electric light will be installed throughout.

BLACKSOD BAY AND HALIFAX.

THE Canadian Associated Press is officially informed that a contract of over \$5,000,000 has been signed for the construction of a railway and new harbor on the west coast of Ireland in connection with the all-red route scheme, which the Canadian government has now approved. The run to Halifax will be made in three and a half days.

THE DREDGE "PORT NELSON."

THE Port Nelson, claimed to be the largest dredge ever built in Canada—and constructed in record time—for the Dominion Government, will be ready to leave shortly on her long journey to Hudson Bay. Upon her departure from the Polson's shipyards, Toronto, she will go down the St. Lawrence River, from there she will go through the Straits of Belle Isle, and along the coast of Labrador and Ungava, thence to her destination.

She will take a cargo in the shape of the stern wheel tug, referred to in another part of this issue.

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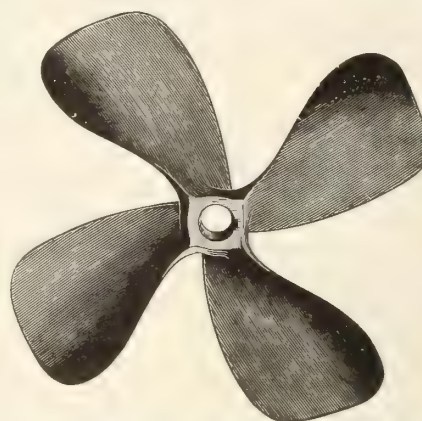
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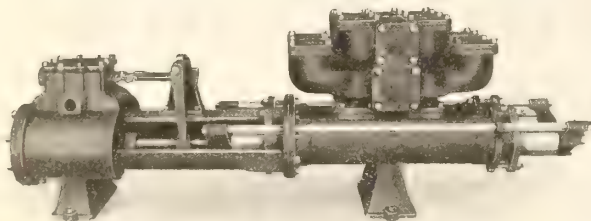


Over 30 Years'
Experience
Building

**ENGINES
AND
Propeller
Wheels**

H. G. TROUT CO.
King Iron Works
226 OHIO ST.
BUFFALO, N. Y.

**STEAM and POWER PUMPS, CON-
DENSERS, TRAVELLING CRANES**



The SMART-TURNER MACHINE CO., Limited
Hamilton Canada

The Otis Feed Water Heater and Purifier

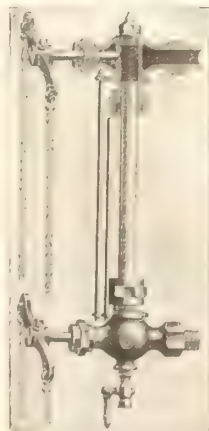
will positively heat feed water to the boiling point without causing back pressure. It will separate oil from the exhaust and prevent a large proportion of ordinary impurities from entering the boiler.

Cleaned quickly and thoroughly in a few minutes. Will not foul up with scale, scum or sediment.

It is sold under a liberal guarantee of satisfaction or money back. If your engineer is having boiler troubles consult us for the remedy.



Stewart Heater Co.
35 Norfolk Ave. Buffalo, N. Y.



—OHIO— Water Gauge

Comes to you fitted with high-grade steam packing—ready to use.

Chain operation protects user.

Ohio Water Gauges, Gauge Cocks and Regulating Valves can be obtained promptly from your dealer.

Write for Catalogue K.C.

The Ohio Brass Co., Mansfield, O.

The advertiser would like to know where you saw his advertisement—tell him.

CANVAS WORK

Hatch and Boat Covers
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JOHN LECKIE LIMITED

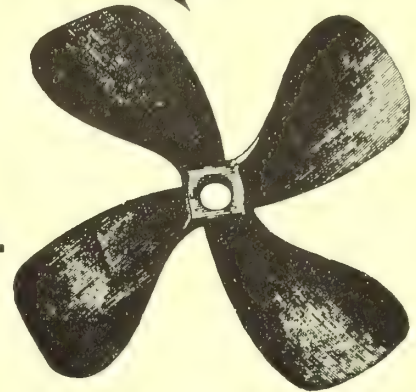
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MANGANESE BRONZE

PROPELLER WHEELS

Tensile
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75,000 lbs.

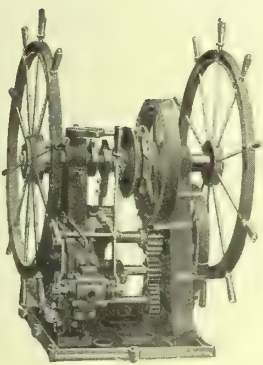


Write to-day for our descriptive booklet.

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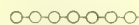
Brass Founders,

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THE DAKE

Steam Steerers for Tugs
and Steamers. Single or
double wheel.

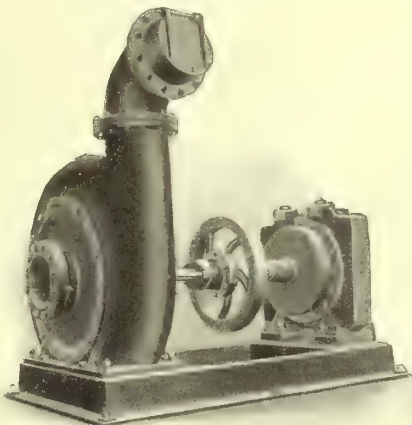


Centrifugal Pumps direct
connected to DAKE engines,
all on one base.

Write for
Complete
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prices.

**Dake
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Co.**

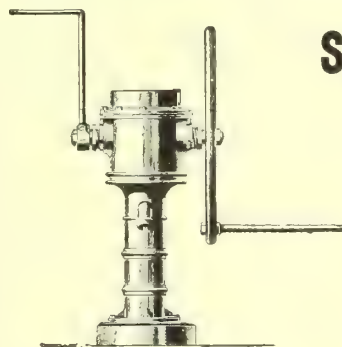
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Ship and Yacht

Fittings of Every
Description

Pumps, Portlights,
Sanitary Appliances,
Folding Lavatories,
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Bells, Hinges, etc.,
Send for Catalogue.



AGENTS WANTED IN CANADA



J. DOWNTON & CO.

69-71 West India Dock Road
LONDON, ENG.

Cables: "John Downton, Phone London."

MARINE ENGINEERING OF CANADA

Collingwood Shipbuilding Co., Limited

Collingwood, Ont., Canada



NORTHERN NAVIGATION COMPANY'S PASSENGER STEAMER "HAMONIK."
Built by The Collingwood Shipbuilding Co., Limited, Collingwood, Ont.

**Steel and Wooden Ships, Engines, Boilers,
Castings and Forgings**

PLANT FITTED WITH MODERN APPLIANCES FOR QUICK WORK

**Dry Docks and Shops Equipped to Operate
Day or Night on Repairs**

The advertiser would like to know where you saw his advertisement—tell him.

CIRCULATES IN EVERY PROVINCE OF CANADA AND ABROAD

MARINE ENGINEERING of Canada

A monthly journal dealing with the progress and development of Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks, and containing a record of the latest and best practice throughout the Sea-going World. Published by

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TORONTO, 143-149 University Ave.

WINNIPEG, 34 Royal Bank Bldg.

LONDON, ENG., 88 Fleet St.

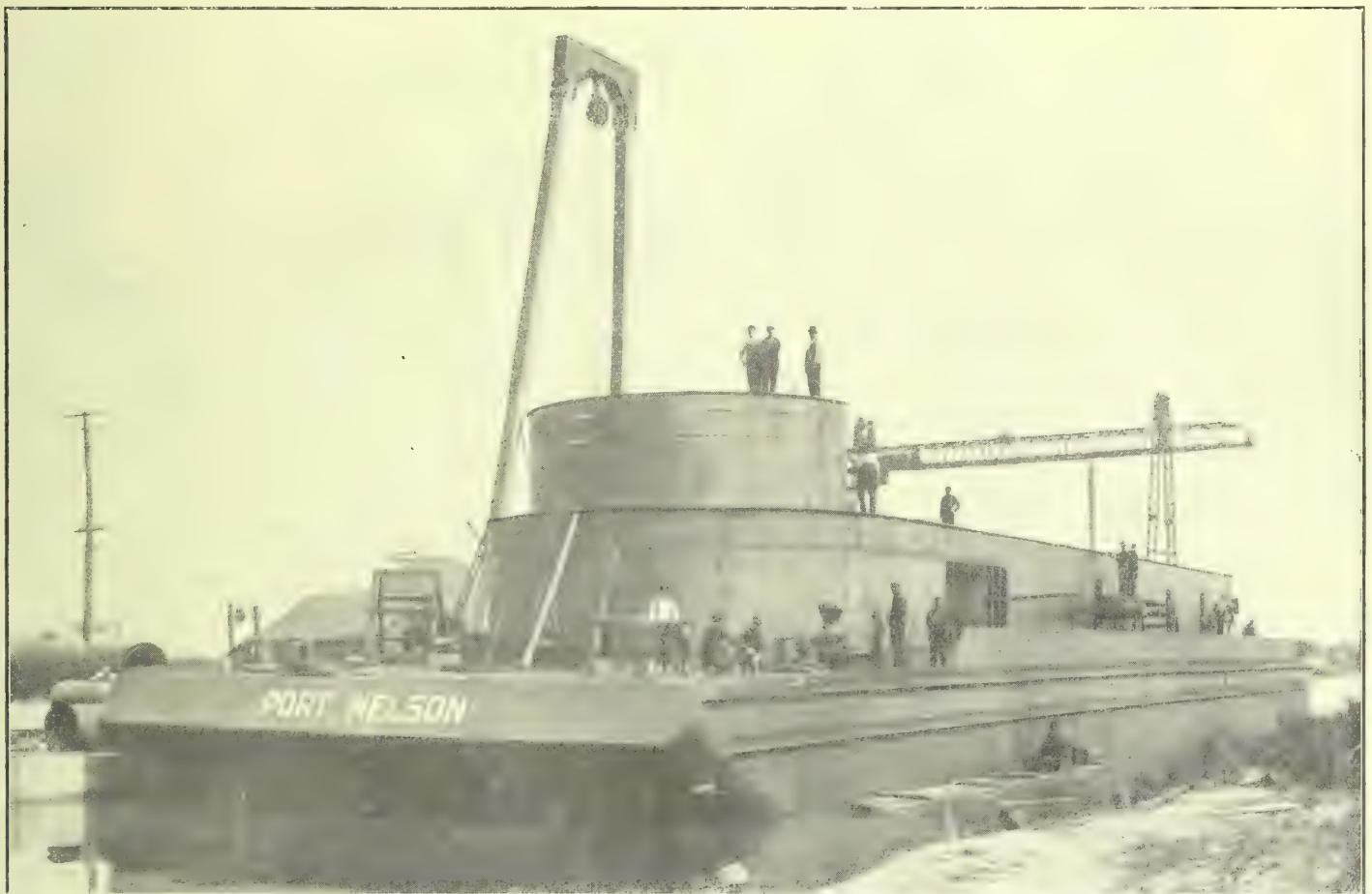
Vol. III.

Publication Office, Toronto—August, 1913

No. 8

POLSON IRON WORKS, LIMITED TORONTO - - CANADA

Steel Shipbuilders
Engineers and Boilermakers



Steel Hydraulic Dredge "Port Nelson" now being built by The Polson Iron Works for the Department of Railways and Canals, to be used in the deepening of the Hudson's Bay Railway Terminal Port in Hudson's Bay.

Manufacturers of

**Steel Vessels, Tugs, Barges, Dredges and Scows
Marine Engines and Boilers all sizes and kinds**

Works and Office : Esplanade Street East.

Piers Nos. 35, 36, 37 and 38

THE TWO SISTER SHIPS

Of the S.S. "IMPERATOR" 50,000 Tons.

THE WORLD'S RECORD ANTI-CORROSIVES.



SPECIFY AND INSIST ON GETTING **BRIGGS'**

THE TWO LARGEST LINERS IN THE WORLD

Are Being Coated **EXCLUSIVELY**

with **BRIGGS'** Bituminous

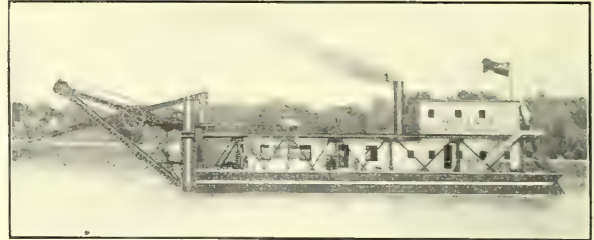
ENAMELS AND SOLUTIONS

WM. BRIGGS & SONS, Ltd., Dundee & London.

Agents for Canada:

MACDONALD & SONS, 176 King St. East, TORONTO.

Dipper Dredges Clam Dredges Steel Scows Drill Boats



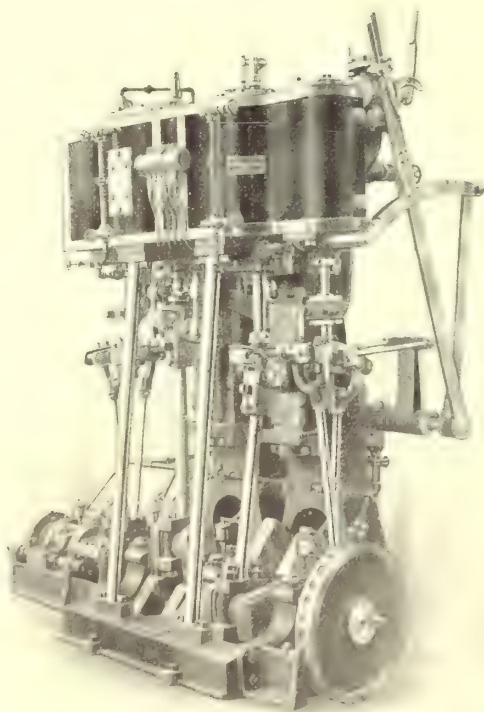
Equipment of this nature together with Hoisting Engines of all kinds are specialties with us.

Let us figure on your requirements.

We have the experience necessary to build anything you need in this line and you will find our prices right.

Send for descriptive matter now.

M. BEATTY & SONS, Limited
WELLAND ONTARIO



This is one of our Compound Jet Condensing Engines with Pumps and Thrust attached.

The Doty Marine Engine & Boiler Co. LIMITED

Builders of High Grade

Marine Engines and Boilers

Compound Jet Condensing Engines

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Triple Expansion Engines

Non-Condensing Stern Wheel Engines

Tandem Compound Stern Wheel Engines

Marine Boilers of various types including Scotch, Locomotive, Fitzgibbon, Fire-box Return Tubular and Safety Water Tube.

Estimates furnished for complete Marine outfits.

The Doty Marine Engine & Boiler Co.

LIMITED

GODERICH,

CANADA

The advertiser would like to know where you saw his advertisement—tell him.

The Seed Drill and The Reaper

¶ It is an amusing, and at the same time significant fact, that men who criticize and condemn advertising the hardest are the men who advertise the least.

¶ And the most violent critic of the lot is the man who doesn't advertise at all.

¶ These men put up strange arguments against advertising sometimes, and one of their pet diversions is to compare advertising with Personal Salesmanship.

¶ To compare Advertising with Personal Salesmanship is to compare the Seed Drill with the Reaper.

¶ They are separate and distinct. Each performs different functions, yet each is necessary for the common good.

¶ They work together, in the same field, for the same man, to the same end.

¶ Advertising is the Seed Drill of Modern Commerce.

¶ It plants the Seed of Good Will in the minds of prospective customers. The seed grows to interest, and interest turns gradually into a desire to possess. The harvest ripens and is garnered in by the ever-ready salesman.

¶ The Salesman is the Reaper of Modern Commerce.

¶ He reaps where advertising has sown.

¶ Advertising performs the missionary, the educational and the preliminary work—The Salesman comes along and with minimum exertion carries away the order, and, frequently, all the glory of securing it.

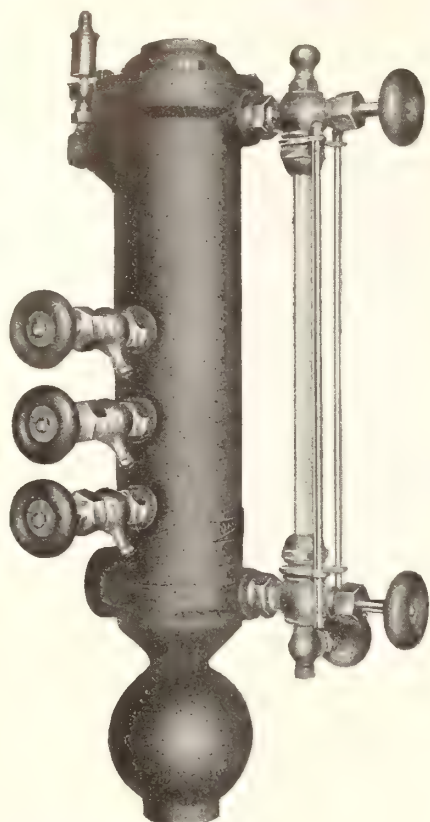
¶ He reaps most who sows the best, and a just man will not forget the seed drill when the reaper is at work.

Rate Card and Full Information Gladly Furnished on Request.

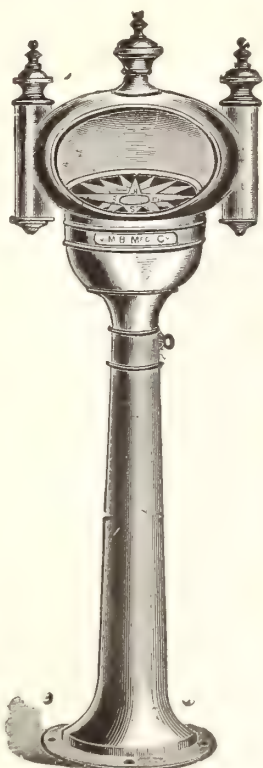
MARINE ENGINEERING of Canada

A monthly journal dealing with the progress and development of the Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks etc.

143 University Avenue TORONTO



Reliable Water Column.
With heavy water gauge mountings, marine gauge cock, high and low whistle alarm.



Brass Binnacle on Polished Brass Pedestal.
We also make short patterns in different styles, with or without compass.

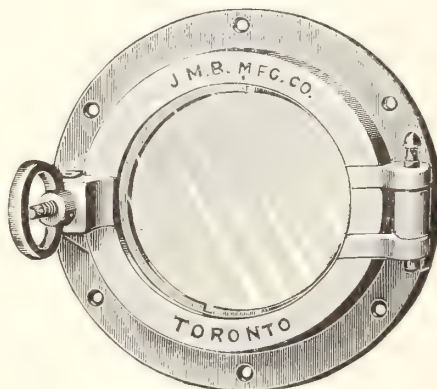
Morrison's

Marine Engineers' Supplies Boiler Accessories, Boiler Fittings and Deck Brass Work

For Marine service all Fixtures must be of substantial design for safety and durability. Our lines are recognized by all Engineers as such, and meet all the requirements where these qualities are necessary.



**Electric Deck Light,
Heavy Type.**

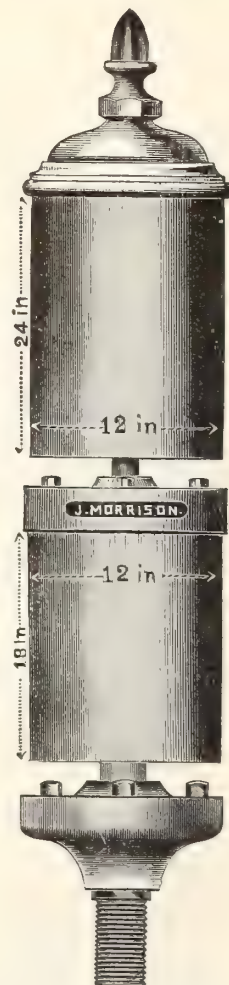


Brass Port Light
Made in different types and sizes from 5 inch to 10 inch diam.

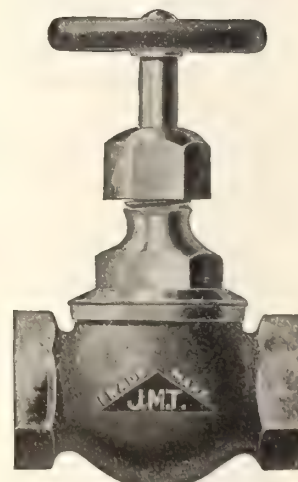
*Your enquiries are solicited upon
any lines in which you are interested.*

**The James Morrison
Brass Mfg. Co., Ltd.**

93-97 Adelaide Street West, Toronto



We make a large variety of Steam Whistles from 1 inch diam. to 14 inch diam.—for all users.



J.M.T. Valve.
Renewable disc made standard and extra heavy pattern, screwed or flanged.

The advertiser would like to know where you saw his advertisement—tell him.

The Shipbuilding Plant of G. T. Davie & Sons, Levis, P.Q.

Staff Article

In this article particular prominence is given to the equipment installed at the Davie Plant, and to the firm's ability to handle large and heavy marine repairs; the S. S. Wabana being a typical example of the latter.

A CROSS the River St. Lawrence from Quebec, a little east of Levis, is a quaint two-storey frame building. The upper storey is a residence, and the lower floor an office. Over the doorway of the latter is a sign which reads: "Patent Slip Office." This refers to an antiquated slip erected seventy-five years ago for doing all kinds of repair work on wood and iron ships up to 150 feet keel. Anchored nearby is the recently launched Canadian Government Hopper Barge No. 1, of 850 tons. The question that naturally arises is, "Where are the shops?" These are at St. Joseph de Levis, several miles eastward, near the Government dry dock. The "patent slip office" is the headquarters for the shipbuilding firm of Geo. T. Davie & Sons, Levis, P.Q.

Importance of the Firm.

Interest has been centred in this firm of late, because of the hopper barge which they are completing for the Government, and of the fact that they have just completed a repair job on the s.s.

Wabana, a vessel of 5,000 tons register, which went on the rocks at Fame Point last May. This vessel was 32 days in the repairers' hands, out of which five Sundays must be deducted. In that time 135 plates were handled, 100 of which were badly buckled and broken, and 50 per cent. renewed.

S.S. "Wabana" Repair.

The "Wabana" was on charter by the Dominion Coal Co., Montreal, when she went on the rocks. She was, however, able to come up the river to Montreal, where she discharged her cargo of coal. It was then suggested that the ship be placed in the new Montreal floating dock for repair, but the underwriters sent her back to Quebec.

Surveyors and experts were called in to examine the ship, and tenders were called for her repair.

A New York firm put in a tender, as did Geo. T. Davie & Sons, and the latter were awarded the contract. The steamer was placed in the Levis dry dock for permanent repairs, superintended at the

start by Mr. Blackett, chief of the London (Eng.) Salvage Co., and afterwards by Mr. Henry Black, expert engineer



THE OLD SLIP.

and Lloyd's surveyor at the port of New York. The Wabana is quite a new ship, being only 15 months old when she went on the rocks.

It is remarkable that the repairs could be done in such a short time, especially when it is considered that the movement of all the material had to be done by hand. The dock is devoid of any travelling cranes or even capstans, and the pumps of the dock are so obsolete that it takes 15 hours to pump the water out, in comparison with 3 hours in other Atlantic dry docks.

Plant Features.

From a glance at the illustrations and a study of the following description of the shipbuilding works located alongside the dry dock, it will be seen at once that the plant is considerably hampered by the need of proper facilities for handling the work between the shops and the vessel. The derricks shown in the illustration seem hardly capable of handling work required for anything like the Wabana contract.

In the shops there is a powerful air compressor, with the necessary receivers and permanent pipe line to dock bottom; also a complete up-to-date outfit of drills, riveters, rammers and other necessary air tools for expeditiously handling repairs to steel or iron steamers. There is a portable compressor which can be moved quickly to deal



DRY DOCK AT LEVIS, QUE., SHOWING VESSELS WINTERING.

with repairs to vessels at the different docks and wharves, while loading or discharging cargo.

The plant contains a complete outfit of differential pulleys, hydraulic blocks for tail shaft and propeller work, and a floating derrick capable of lifting and moving loads of from fifteen to twenty tons. The shops, vessels and docks are lighted with electricity. There is also telephone communication between the main office at Levis and the works and docks, enabling touch to be kept with

two Hetherington, Manchester, patent swing countersinking machines.

The plate furnace is capable of dealing with the largest plates in general use. The angle furnace is up-to-date, with a large bending block area, enabling stern bars to be curved up to 70 ft. long. There is a side lever cold saw, for cutting butts off garboard plates, with all the necessary gear for quick manipulation. In the engineering department there is a large multiple drill for stern frame work, with other drills



S. S. "WABANA" IN DRY DOCK AT LEVIS, QUE.

all departments, thus securing prompt despatch on all repair and other jobs.

The firm has purchased from A. W. Smith & Son, Limited, Glasgow, Scotland, and installed in their shops, a set of rolls, capable of rolling plates up to 26 ft. 6 in. long, and of any width and thickness in use or likely to be used in steel shipbuilding; one cam and lever wide gap punch, with powerful cranes to handle plates 30 ft. long, 7 ft. wide and 1 ft. 6 in. thick. They have also purchased from the same firm a combined horizontal beam bender punch and shaper, capable of curving beams of any section used in shipbuilding, and forming channels, tees, etc., to any reasonable angle, thus eliminating expensive angle smith work. There is also a Cameron, Manchester, cam and lever punch, shear and angle cutter, capable of dealing with plates up to 1 1/4 inches thick, and cutting angles 7 x 7 inches.

Among the equipment there are also a double-ended punch and shear, made by Barry's, Sowerby Bridge, England, which will punch up to 1 inch in thickness, and a portable punch for casing work on ship decks; a heavy set of Cameron rolls for plates 16 ft. long; a plate planing machine, by the same maker; a Shank's keel bender; a Barry horizontal punch and beam bender, and

for lighter work. In addition to the foregoing, there are shaper and scarping machines, lathes, planers, and other machine tools generally associated with marine and general engineering plants.

In the blacksmith's department there is a Shank's steam hammer with 24 in. lift, two rivet making machines, and the usual outfit of a first-class forge. Material carried in stock, including plates, angles, bulb angles, channels, tees, rounds, half-rounds, squares, etc., is very large. Keel and stern bars, chequered plates, and every section that the last twenty years of shipbuilding has made necessary, are kept on hand. Large quantities of rivets of suitable sizes, all of which are certified by Lloyd's Register of British and Foreign Shipping, Bureau Veritas, or other classification, are also kept in stock.

WELLAND CANAL MISHAP.

NAVIGATION on the Welland Canal was blocked from 2.30 p.m. on August 2, until 8.30 the following morning by an accident which has only one near-parallel in the history of the canal.

The steamer Lehigh, which had al-

ready, made three trips this season through the Welland Canal with coal from Ohio ports to Montreal, entered Lock 23, bound down, at an unusual rate of speed. Efforts to check the big steel freighter, heavily loaded with coal were ineffectual. She struck the foot gates with great force, smashing them off to within 8 feet of the bottom. The flood of water from the level above hurled the boat over the remaining portions of the broken gates to the level of water 14 feet below.

The big craft made the descent with a dive which submerged her bow for a time, and caused her to ship a quantity of water. One of the blades of her propeller was snapped off, and a hole was stove in her bottom. As the rush of water continued flowing over the banks, the Lehigh was swept down the entire length of the level at rapid speed, straight for the steamer Fairmount, which was emerging from Lock 22.

Rather than collide with the other steamer, the captain of the Lehigh ran his boat into the stone abutment, where she soon began to settle. The pumps were at once started, and with the assistance of another pump loaned by the canal officials, the vessel was kept afloat. The Lehigh is owned by the Anchor Line of Buffalo.

The break in the canal was repaired on Aug. 3, and navigation resumed.

RECORD DAY'S OUTPUT FOR THE "COROZAL."

THE Corozal established a new one-day record for ladder dredges in the Panama Canal service, on Friday, July 11, by excavating 13,700 cubic yards of material, 90 per cent. of which was rock, in 19 hours and 50 minutes actual working time, an average of about 685 cubic yards an hour. The dredge has been working in the Canal prism, north of the old dam, ever since the latter was dynamited on May 18, and during nine days up to July 12, in which it was operated, the daily average of material excavated has been approximately 12,000 cubic yards. The dredge was taken off the work on Saturday, July 12, in order to have its top tumbler replaced. The tumbler is made up of five separate pieces, and is hard to handle with the cranes available. When the new floating cranes are in service, it is estimated that the exchange of tumblers may be effected within 24 hours.

The Corozal was built on the Clyde by Wm. Simons & Co., Ltd., and a description of the vessel appeared in our issue of May, 1912.

TWO QUICK REPAIR JOBS.

By J. H. W.

ON A recent voyage of the twin screw Allan Liner "Hesperian" from Glasgow to Montreal the port engine failed on the second day out, and investigation showed that the low pressure crank had broken in the main after bearing. The break took the form of a spiral, and extended about three-quarters way round the shaft. The voyage was continued with the starboard engine only, and Montreal was reached without further incident two days behind schedule. A message had been dispatched from Father Point to the Hall Engineering Works, Montreal, asking them to be prepared to commence work on the repair immediately the vessel docked. Mr. Thomas Hall, managing director, and his chief assistant, Mr. W. Fletcher, personally supervised the work, which consisted in replacing the broken crank with a spare one carried on board.

At first sight this does not seem to be a very lengthy job, but it must be remembered that it involved the removal of the engine room gratings as well as a large amount of auxiliary piping. The broken crank had to be uncoupled, the bearings taken out and the connecting rod removed. The crank, which weighed 8 tons, was then lifted out.

The spare crank was being carried upended in a corner of the engine room, and being in a rather awkward position, it had to be very carefully handled on account of its proximity to a fan engine and a Weir pump. However, it was successfully raised by means of blocks and jacks and placed in position in the bearings. It was then lined up, the holes for the coupling bolts reamed out, and new bolts fitted. After the crank had been coupled up to its neighbor, the connecting rod was replaced and adjusted, and all auxiliary piping, etc., put back in position. Work was carried on day and night, about twenty men being employed. The Hesperian docked on Thursday morning, July 17, and the repairs were completed by the following Sunday night. It will generally be admitted that this constitutes a remarkably good performance, and one that reflects credit on the Hall Engineering Works.

S.S. Comet.

This company also recently effected a very quick repair to the S.S. Comet, of New York. The Comet is a new tank steamer belonging to the Standard Oil Company. On July 22 last she arrived at Montreal with all four blades of her sectional bronze propeller badly bent through striking a dock wall. Repairs were carried out in the short space of ten hours without putting the vessel into dry dock.

She was tipped by filling her fore

peak and forward tanks until the propeller was out of the water. Three of the blades were then removed and taken ashore to the shops of the Hall Engineering Works to be straightened. The fourth was left on the boss, it being found feasible to straighten it in position by means of hydraulic jacks and hammers. Notwithstanding the fact that the blades were very much bent the whole of the work was completed between 10 a.m. and 8 p.m. of one day.



INJURY TO THE "LAKE MANITOBA."

ON July 29, in the early hours of the morning, the C.P.R. Atlantic liner "Lake Manitoba" had her bottom somewhat seriously damaged by stranding off the Isle of Orleans in the St. Lawrence, while inward bound for Quebec and Montreal. The weather was very hazy at the time, and the Lake Manitoba took the ground in avoiding another vessel which suddenly loomed up out of the mist. The engines were prompt-

plates would have to be renewed involving a large amount of heavy work. After temporary repairs had been expeditiously carried out by the Canadian Vickers Co., the Lake Manitoba left on August 8 for New York, where permanent repairs will be effected by the Robins Dry Dock Co., at Brooklyn.

This step was rendered necessary by the discovery of the full extent of the injuries sustained, as these necessitated the use of a large machine shop and forge than are not yet available at the site of the "Duke of Connaught" dry dock. However, but for the Canadian Vickers Company, the Lake Manitoba would have been held up for a very long time, because the dry dock at Quebec was, at the time of the accident, already occupied, and another vessel was waiting her turn to go in.

The Canadian Vickers Company are rapidly perfecting their organization and equipment. They have already reclaimed about 145 acres of land in the vicinity of the dry dock, and on this they will erect up-to-date shops, fully equipped for heavy work. All this,



C.P.R. LINER "LAKE MANITOBA," IN "DUKE OF CONNAUGHT" DRYDOCK AT MONTREAL.

ly reversed, and the vessel slid off into deep water after being less than five minutes aground.

She was found to be making some water, but this her pumps were easily able to keep under, and she proceeded on her way up the river, her passengers and cargo being discharged in due course at Montreal. The vessel was then placed in the floating dry dock of the Canadian Vickers Company at Maisonneuve for repairs, when it was found that the damage sustained was considerably greater than at first thought probable. It was seen that about eighty

however, necessarily takes time, but no doubt by next season, great progress will have been made, and the company will then be in a position to undertake any repairs that a damaged liner may require, no matter how heavy.



A good all-around aluminium mixture is an alloy containing 92 per cent. of aluminium and 8 per cent. of copper. This mixture casts well, does not crystallize in service, or crack in the mould, and has a fair tensile strength.

Launch of a Powerful Bucket Dredge at Collingwood, Ont.

By C. T. R.

The Collingwood Shipbuilding Co. have shown commendable enterprise in undertaking the construction of the two dredges—the launch of the first of which, together with leading features of their equipment, forms the substance of this short article, and by so doing add to the already indisputable evidence available, that shipbuilding in Canada lacks only encouragement, official and otherwise, to place it in the forefront among our other industries.

ON Monday, July 28, there was launched from the yard of the Collingwood Shipbuilding Co., Ltd., Collingwood, Ont., the first of two large bucket dredges which they are building to the order of the Canadian Government Department of Marine and Fisheries. These vessels are intended to operate in the St. Lawrence ship channel and are capable of digging in hard pan to a depth of 52 ft. below the surface of the water. The principal dimensions are as follows:—

Length, b.p. 215 ft.; breadth moulded, 37 ft. 6 in., depth, moulded, 14 ft. The whole of the work has been carried out under Lloyd's special survey for their 100-A1 dredge class.

Machinery Equipment.

The vessel is self-propelled by means of a set of triple expansion, surface condensing engines with cylinders 15 in., 25 in., and 42 in., diameter, by 26 in. stroke, supplied with steam from two Scotch boilers 10 ft. 6 in. long by 11 ft. 6 in. diameter, working at 180 lbs. pressure. Suitable clutch gear is ar-

ranged so that the main engine can be disconnected from the propeller shaft and made to operate the chain of buckets. All the gearing in connection with these arrangements is of a very substantial nature. There are 40 buckets on the chain, each of 27 cubic feet capacity.

The manoeuvring of the vessel while at work is carried out by means of exceptionally powerful winches; there being fitted one bow winch, one stern winch and two large breasting winches. In addition to these, a very powerful hoisting engine is fitted for operating the bucket ladder, a small winch for operating the side chute, and two powerful deck capstans for warping. A very complete set of engine room auxiliaries are installed and no expense has been spared to make the vessel complete in every respect.

Vessel Equipment.

Accommodation for the dredging master and officers is provided on a promenade deck aft, consisting of very airy well-ventilated cabins, while the crew

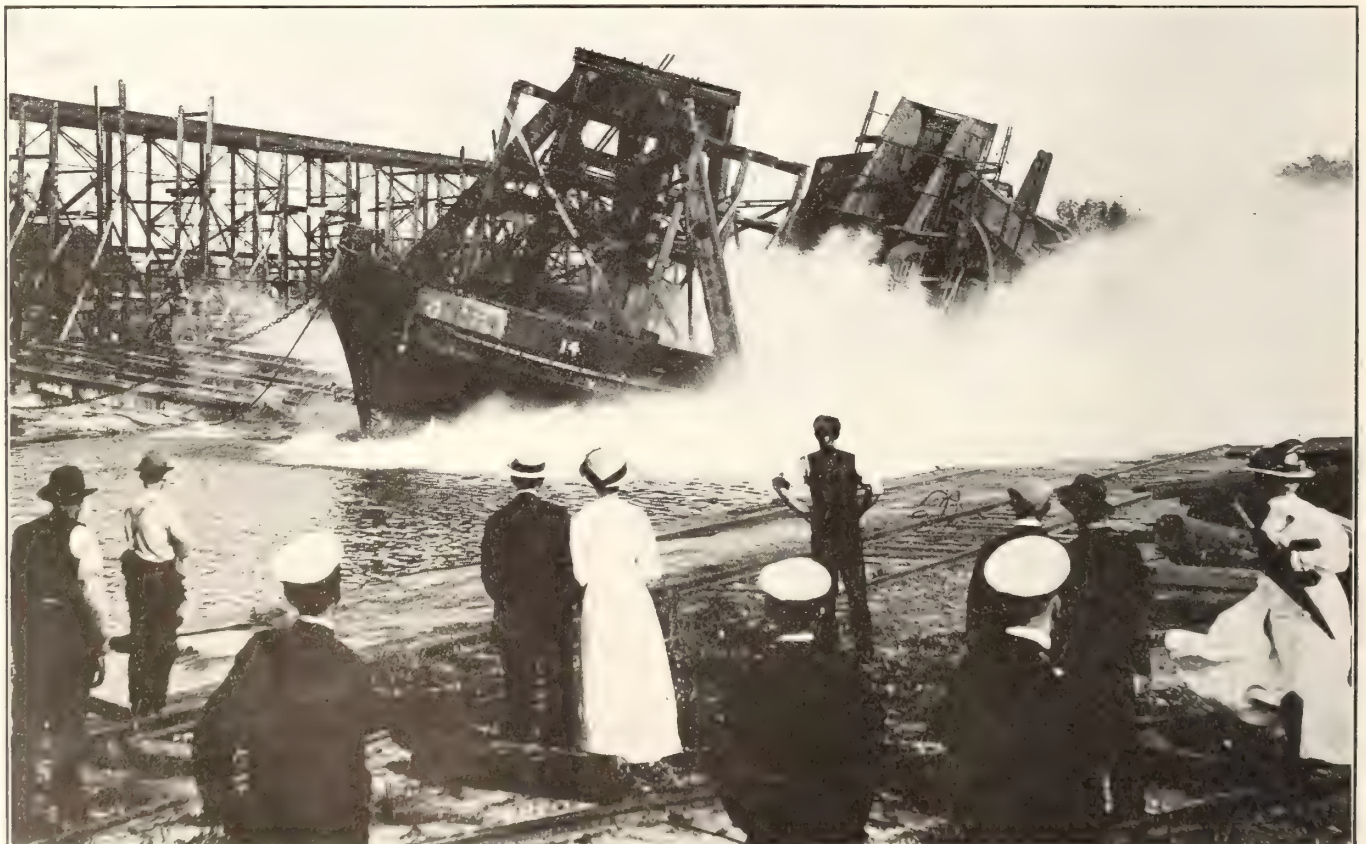
are berthed under the main deck forward on the port side. Forward of the crew space, a large workshop has been installed for taking care of the necessary repairs which may be required to the dredging gear while the vessel is in service.

The Department of Marine and Fisheries was represented at the launch by Mr. Cecil Doutre, purchasing and contract agent, and the christening ceremony was gracefully performed by Miss Isabel Lindsay, the charming little daughter of Mr. Sanford H. Lindsay, secretary-treasurer of the Collingwood Shipbuilding Co.



ST. LAWRENCE RIVER WATER LEVEL.

AN elaborate plan for increasing or at least maintaining at a consistent level the waters of the St. Lawrence below Quebec will be prepared by the Commission now investigating the question. It is fairly well advanced in its work.



LAUNCH OF BUCKET DREDGE NO. 14 AT COLLINGWOOD, ONT.

The function of the Commission is not, as stated in some quarters, to determine the feasibility of the 35-foot channel. That has been decided upon, and is being proceeded with. Rather, the idea is to determine why at certain seasons of navigation there is low water, while at others there is a sufficiency of it.

gations are completed, but the present indications are that they will be along the lines above mentioned.



FRENCH LINE DROPS MONTREAL.

A RUMOR has been current for some time past that the French line had made its last sailing to Montreal, for

June sailing from Havre had to be dropped in consequence of an accident to a boat belonging to the line on the New York route, La Touraine having to take her place temporarily. Passengers who had booked from Montreal by the French liner had to be otherwise accommodated. This was done, but the new venture received a setback, which combined with the lack of freight offering, decided the management to discontinue future sailings beyond Quebec.



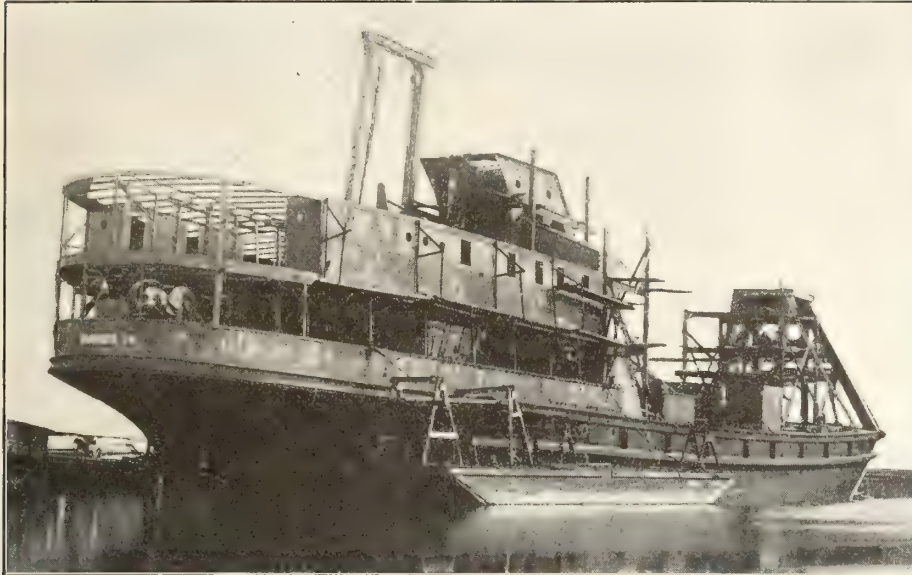
RICHELIEU RIVER LIGHTS.

EXTENSIVE alterations and improvements have been effected on the Richelieu river. All the lights have been rebuilt on concrete piers, and a flat light has been put in position at St. Denis to facilitate approach to the wharf. A light has also been installed on one of the piers to facilitate approach to the bridge at Beloeil. The last is one of the greatest improvements effected, for the pronounced bend in the approaches to the bridge has, in the past, often caused confusion to navigators, and to small craft, was a positive source of danger. The new light, however, renders the approach perfectly safe in all weather. The light at Point Alamule has been rebuilt and a three-section tower put up. Stronger lights with a range of six miles have been installed.



THE CUNARD LINER LUSITANIA.

AFTER being out of commission since the latter part of last December, the Cunard Liner Lusitania is again be-



BUCKET DREDGE NO. 14 FITTING OUT.

All the way down from Port Arthur to the sea automatic gauges have been installed to record the flow and depth of water from week to week, while several investigating parties below Montreal are enquiring into the varying depths, volume and velocity of the river.

Contributory Causes.

The investigations so far tend to disclose the fact that there are various influences contributory to the conditions prevailing. One is the flow of the Chicago Drainage Canal, and the volume of water diverted by it from Lake Michigan. Another factor is precipitation. In a dry season the river levels are very much affected by the lack of rain.

The Commission will make a number of practical suggestions for works to overcome the variation of navigation conditions, and to ensure a steady flow. It is understood that the suggestion of damming the St. Lawrence in the lower part at several points and allowing ships to lock through is not likely to be favored at all.

What is more probable is that, coincident with the deepening of the channel, a series of compensating works be put in to regulate the flow. One way of doing this is by means of a system of submerged embankments along the channel to ensure the greater depth of water being maintained throughout the season.

The exact character of the recommendations will, of course, not be finally known till the preliminary investi-

the present season, at any rate. This rumor received official confirmation recently, when it was stated that La Touraine had made her last appearance in this port, owing, it was added, to the lack of freight offering between Montreal and Havre, the cream of which has been secured by the Allen line,



BUCKET DREDGE NO. 14 FITTING OUT.

which, shippers seem loth to desert.

The first sailing of La Touraine to Montreal, was made last May, but the

ing prepared to take her place on the service, and will, under the present arrangements, sail from the Mersey for

New York on Saturday, August 23. During the eight months that the *Lusitania* has been berthed at Liverpool, every part of the huge liner, external and internal, has been thoroughly overhauled, and she will be at the time of departure in as excellent condition as she was when first placed on the service.

The *Lusitania*, with her sistership *Mauretania*, are looked upon as the highest achievement in naval architecture and marine engineering, and during the period they have been in commission, these leviathans have, by their record-breaking performances, added lustre to the famous Cunard Company, and are vessels of which the British public are justly proud. It is expected that the *Lusitania* will carry from Liverpool when she leaves on the 23rd inst, over 500 first-class passengers and a full number of second and third-class passengers, as the berths are being rapidly booked.

The Transatlantic passenger traffic westward is now at its height, and the *Lusitania* and *Mauretania* receive a considerable patronage of the aristocracy from both sides of the Atlantic.

IMPRESSIVE.

THE navy increases of Great Britain were rather impressively set forth in the estimates introduced in the House of Commons on July 17. "We are," it is explained, "due to receive a torpedo-boat destroyer on the average of one a week for the next nine months. During the next 12 months we shall receive on the average a light cruiser every 30 days, and during the next 18 months we shall on the average receive a super-Dreadnought of the latest possible type, and of the highest possible cost every 45 days." Incidentally, it is held that the age of oil firing has come, and that destroyers, cruisers and battleships are all being ordered for oil firing only.

RICHELIEU & ONTARIO.

THE two directors of the Richelieu & Ontario Navigation Co. who were perhaps most instrumental in bringing about the Canada Transportation Lines merger, have retired from the Richelieu Board. After a meeting of the Board of Directors held this week in Montreal, it was announced that Edmund Bristol, M.P., and Mr. Grant Morden of the Richelieu Board of Directors had retired in favor of Messrs. J. M. Norcross of Toronto, and J. P. Steedman, of Hamilton. Mr. J. M. Norcross, one of the two

new directors, is slated as general manager of the Canada Transportation Lines, which is to absorb the old Richelieu, as well as the Northern, Inland, Niagara and other lines acquired or in process of acquisition, by the big navigation merger. He is at present managing director of the Canada Interlake Line.

The Richelieu Board is now made up as follows: James Carruthers, president; W. Wainwright, vice-president; J. Playfair, vice-president; Sir H. Montagu Allan, J. R. Binning, Wm. Hanson, Hon. J. P. B. Casgrain, C. A. Barnard, H. B. Smith, F. A. Magee, W. D. Matthews, H. W. Richardson, Claud G. Bryan, J. P. Steedman and J. M. Norcross.

LLOYD'S WRECK STATISTICS FOR 1912.

HE statistical summary of vessels totally lost, broken up, condemned, etc., now published by Lloyd's Register, shows that, during 1912, the gross reduction in the effective mercantile marine of the world amounted to 720 vessels of 748,965 tons, excluding all vessels of less than 100 tons. Of this total, 379 vessels of 572,745 tons were steamers, and 341 of 176,220 tons were sailing vessels. The figures are lower than those for 1911 by 135,878 tons (47,007 tons steam, and 88,871 tons sail).

One of the most common terminations of a vessel's career is by breaking up, dismantling, etc., (not in consequence of casualty). The amount of tonnage so dealt with in 1912 was 157,641 tons, this being 97,876 tons less than that for 1911. Nearly 23 per cent. of the steamers and 24 per cent. of the sailing vessels removed from the merchant fleets of the world in the course of 1912 are accounted for in this manner. Of the total tonnage of such cases, over 38 per cent. is represented by United Kingdom vessels. The number and tonnage of vessels lost, etc., during the previous ten years are as follows:—

YEAR.	STEAMERS.		SAILING VESSELS.	
	No.	Tons (gr.)	No.	Tons (Net)
1902	301	408,363	571	292,327
1903	326	479,081	596	300,722
1904	344	512,879	463	225,266
1905	382	527,978	501	264,376
1906	378	509,707	567	307,105
1907	356	565,119	512	286,105
1908	382	566,487	418	242,805
1909	383	645,670	483	293,562
1910	421	667,440	442	280,250
1911	427	619,752	461	265,091

The statistical tables exhibit interesting data as to the relative frequency of the different kinds of casualty, etc., which conclude the existence of vessels. Strandings and kindred casualties which are comprised under the term "wrecked," are much the most prolific cause of disaster. To such casualties are attributable over 54 per cent. of the losses of steamers, and over 55 per cent. of

sailing vessels. Cases of abandoned, foundered, and missing vessels are no doubt frequently more or less similar in the circumstances of loss. If these be taken collectively, they form over 24 per cent. of the steamers, and over 29½ per cent. of the sailing vessels removed from the mercantile marine during 1912, owing to casualty.

The return has been prepared in such a manner as to enable a comparison to be made between the percentages of loss suffered by each of the principal merchant navies in the world. Great as the absolute annual loss of vessels belonging to the United Kingdom appears to be, it is seen to form but a very moderate percentage of the mercantile marine of the country, and to compare favorably with the losses sustained by the other principal maritime countries.

CANADIAN GOVERNMENT SUBSIDIES TO STEAMSHIPS.

IN subsidies to steamships, the Canadian Government will pay this year \$2,238,600. For this sum, the mails are carried free, and freight and passenger service maintained on the ocean and coastal routes for the development of foreign and domestic trade.

Atlantic Service.

The principal service is that on the Atlantic between Canada and Great Britain. Under the new contract made this year, the Government is paying one million dollars annually for a tri-weekly service performed by 12 steamships, instead of \$600,000 a year for a weekly service by four steamships as formerly. The new contract is with four companies. The Allan, the C.P.R., the Canadian Northern and the White Star-Dominion lines. In former years, the contract was with the Allan Line, who divided up the subsidy and sailings with the Canadian Pacific.

On the Pacific, there are several ocean service contracts, chief of which is that between Vancouver and Hong Kong, China, with calls both ways at Yokohama, Japan. This service is performed by the Canadian Pacific Co., the yearly subsidy being \$225,000, of which Canada pays \$125,000 and Great Britain \$100,000.

A subsidy of \$180,000 yearly is paid for a monthly service between Vancouver and Auckland, New Zealand, 6,366 miles.

The subsidized steamship service having the longest route is that between Canada and New Zealand, via the Atlantic, the distance between terminal points being 15,650 miles, for which the subsidy paid is \$120,000 yearly.



A PACIFIC COAST SHIPBUILDING INDUSTRY.

WITH the completion of the modern steel steamship Princess Maquinna at Esquimalt, B.C., a new record has been established in connection with the shipbuilding industry on the British Columbia coast. Ten years ago, this industry was in its infancy, and at the time the wooden steamer Princess Beatrice was constructed by the B. C. Marine Railway Co., Ltd., few would have dared to predict that the well-known shipbuilding firm at Esquimalt would to-day be turning out such magnificent vessels as the one above referred to.

The first vessel of any size to be placed under construction at Esquimalt was the Princess Beatrice, a vessel of 1,290 tons register, 195 feet long, 37.4 feet beam and 15.2 depth of hold. She was turned over to the C.P.R. in 1903, and has done yeoman service for that corporation during her many years' service on this coast. Four years later, the more pretentious steamer Princess Royal, 2,000 tons, was launched. She also, was of wooden construction and it was not until 1908 that the first steel ships were being built at the Esquimalt yards. The steam tug Nanoose was completed for the Canadian Pacific Co. in that year.

Within a few months of the completion of the Nanoose, the twin-screw steel steamer Lillooet was turned out to the order of the Dominion Government. She was a vessel of 600 tons register, and was specially designed for survey work on the Pacific coast.

The steel steamer Madge was built for the Dominion Government in 1907, and since that time has been in regular commission as the quarantine tender at William Head. In addition to these serviceable vessels, the B.C. Marine Railway Co. last year completed a steel car-ferry, 250 feet in length and fitted with three tracks, for the C.P.R. trans-gulf service. At the present time, there is under construction a similar steel car-ferry 260 feet long. Each car-ferry has accommodation for fifteen cars.

The Princess Maquinna.

Undoubtedly the greatest achievement is the Princess Maquinna. She is

a vessel of graceful lines, and compares favorably in every way with the modern passenger coastal steamers that have been brought out from the shipbuilding yards of Great Britain.

The Maquinna is, both in design and construction, far superior to the older vessels, which more clearly than anything else goes to show the development that has taken place in the shipbuilding industry at Esquimalt. At the present moment, the yards at Victoria's shipbuilding centre are a hive of industry. Large gangs of mechanics and fitters have been working overtime in order that the Princess Maquinna may be made ready for her trials, which auspicious occasion will be celebrated with due éclat.

The fact that such a fine ship as the Maquinna can be constructed in local yards augurs well for the future of Esquimalt as a centre of great shipbuilding activity.



SHIP'S NAME EXPLAINED.

JUST why Capt. Troup, manager of the C.P.R. coast service, named the new steamship for the run on the west coast of Vancouver Island the "Princess Maquinna" has been somewhat of a puzzle to many newcomers to British Columbia, but it is not so to the old-timers who have read Capt. Vancouver's book on his discovery of Puget Sound.

The story dates back to 1792, when Capt. Vancouver, accompanied by Signor Quadra of the Spanish fleet, conferred on the daughter of old Chief Maquinna the title of "Princess." It was while searching around for a name that Capt. Troup turned to Capt. Vancouver's writings, and soon found a name entirely suitable.

In that early time, Chief Maquinna held dominion over most of the North-West, and shortly before Capt. Vancouver visited him, he had declared his daughter heir to all his great wealth and power. Capt. Vancouver's visit was very formal, and there was much feasting and unusual celebration when "Princess Maquinna" was given her title.

C.P.R. PACIFIC COAST STEAMSHIP APPOINTMENT.

WORD was received at the C. P. R. headquarters on August 22 of the appointment of Lincoln Smith as assistant to the manager of the British Columbia coast steamship service of the C. P. R., with office at Victoria, B.C. This is a well-earned promotion, and hearty congratulations have been extended Mr. Smith by his many friends.

Mr. Lincoln Smith first joined the Canadian Pacific Railway as a clerk in the operating department at Toronto, and remained there until 1892, when he entered the steamship department in that city in a similar capacity. The following year he went to Montreal, and five years later was transferred to Owen Sound.

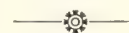
In 1903 Mr. Smith was appointed superintendent of the Upper Lake steamers, with office at Owen Sound, and subsequently in 1908 he proceeded to Victoria as chief clerk in the general superintendent's office of the British Columbia coast steamship service, which position he occupied until his present promotion.



PACIFIC COAST WRECK.

THIRTY-THREE or more passengers and seven members of the crew of the Pacific Coast Steamship Co. S.S. State of California, perished on Sunday morning, August 17, in Gambier Bay, ninety miles south of Juneau, when the vessel struck an uncharted rock and sank in three minutes with many passengers imprisoned in their state rooms.

The steamship left Seattle on Wednesday, August 13, for Skagway and way points. As all the records are lost, it is not possible to get a complete list of the missing.



FISHERY CRUISER LAUNCHED.

ON July 6th, the Dublin Dockyard, Co. Dublin, Ireland, launched the first of the two fishery cruisers which they are building to the order of the Canadian Government for service on the Pacific Coast. The vessel, which was nam-

ed Malaspina, is 162 ft. in length, 27 ft. in breadth and 13 ft. 11 in. in depth moulded. She is divided by transverse and longitudinal bulkheads into no fewer than twenty water-tight compartments. The propelling machinery, which is being supplied by David Rowan & Co., Glasgow, consists of triple-expansion engines designed to give a high rate of speed. Steam will be supplied at 180 lbs. pressure from a marine type boiler working under forced draught on the Howden system.

HALF A CENTURY AT SEA.

A HALF century at sea, the years crowded with thrilling experiences, has just been completed by Captain Frank Carey of the Canadian Pacific Railway steamship service liner Tyrolia, which plies between Montreal and Trieste and Naples. From deck boy to commodore of an Atlantic fleet is a big rise, but that is one that Captain Carey has taken since he sailed from his first port as a deck boy in 1863.

That was in the days of sailing vessels, the big steamers of this century being then but vague dreams. He cleared on the old sailing barque Catherine for Quebec. From deck boy he rapidly rose until he became mate of sailing vessels. He served two years and a half with the Allans and then entered the old Beaver line with which he was transferred to the C.P.R. fleet when that line of steamers was taken over. He has been with the Beaver and the C.P.R. since 1880, being Commodore of the Atlantic fleet now, and the oldest captain in years of service with the company.

An Adventurous Career.

The captain has had an adventurous career. When he was second officer of the Lake Winnipeg, one terrible February day, he fought with the waves in mid-Atlantic to save six sailors who were almost frozen to death in the rigging of a Norwegian barque. Captain Carey went to their aid, and after heroic efforts succeeded in getting a line aboard and saving the six. For this act of conspicuous bravery he was awarded a medal by the Norwegian Government, another from the Shipwreck and Humane Society and a third by the Mercantile Marine Association.

Captain Carey was also once on the old Lake Huron when he picked up the Canadian ship Kate Cann bound for Yarmouth. She lost all her boats but one in a terrible gale that had been lashing the sea into mountainous waves. Her masts were gone and boats crushed in and she was full of water. The boat had been patched up with tallow before the rescue could be attempted, but the entire crew was saved.

Captain Carey could tell a further trying experiences during his long career afloat. He was the commander of the Empress of Ireland on her first four trips to Quebec, and at the end of the first voyage he was presented with a silver cup, a rose bowl, and an album, suitably inscribed by the passengers.

HARBOR BOARD INSPECTION.

AN inspection of works proceeding on the south shore was made by the Harbor Commissioners on August 21. The removal of the temporary works at Moffatt's Island was inspected, and, though their removal cannot be completed for some time to come, it has been demonstrated that already more water is being diverted from the north into the south channel, with a consequent diminution of the velocity of the current, and, therefore, greater security for shipping.

The wharf at Longueil was visited, and an inspection made of the work of the dredges. One of the dredges loaded 150 cubic yards of mud into a scow, filling it within a period of ten minutes; in fact, it was shown that the dredges can excavate mud into the scows at a speed greater than that at which tugs can be procured for towing the scows, when filled, away.

COALING PLANT AT HALIFAX.

THERE will soon be completed at Halifax, N.S., a modern coal-loading and discharging plant erected by the Dominion Coal Co., which will place the Nova Scotian capital in line with the leading ports on the Atlantic, in the matter of coaling facilities. Of course, the piers are not as large or as extensive as in Sydney, which are the largest in America, and excelled by few in the world, but still they are of a very improved pattern, and will greatly facilitate the bunkering of coal at Halifax.

Three Big Towers.

Three bridge towers, each reared 95 feet in the air and mounted on wheeled trucks, have been put in position at the outer extremity of the Company's wharf ready for use, while moored alongside the jetty is a barge of 600 tons burden, at one end of which is a powerful steam lift for bunkering ships in mid-stream. The former entailed an expenditure of about \$36,000, and the latter cost \$20,000 to build. The installation of this equipment will completely revolutionize the loading and discharge of coal at Halifax, and marks a turning point in the development of bunkering facilities there.

The best result obtained at Halifax previous to the construction of these

piers, in loading a steamer in the stream with fuel, was forty-five tons an hour. The new automatic barge is capable of averaging a hundred and fifty tons an hour, more than thrice the speed.

The new automatic barge is sub-divided into six pockets leading to a tunnel extending its full length, and holds 600 tons of coal. At the stern, the coal is lifted by a revolving chain of 167 buckets, carrying 50 pounds each. The coal is elevated at great speed by the buckets on to a moving rubber belt forcing it through a chute into the ship's bunkers.

Four tons a minute is the rate in which the monster steel clams of the tower booms scoop up the coal from a laden collier, and dump it into a compartment within the tower of a capacity of ninety tons. It is then dropped from the tower compartment into hoppers beneath which run along a track into the coal sheds.

LOCATION OF NEW ELEVATOR AT MONTREAL.

THE new elevator, which the Montreal Harbor Commissioners will erect next summer, will be built either at Windmill Point or at the Tarte pier, Maisonneuve. The odds are in favor of the latter site, as at that point better loading and unloading facilities can be obtained for both ocean and lake vessels. Windmill Point is already often seriously congested with grain ships, colliers and liners, and with the increase of a million bushels in the storage capacity of the Grand Trunk elevator and the construction within the next few years of a new entrance into the Lachine Canal, combined with the steady increasing lake and river trade, that congestion is likely to increase. These considerations are likely to influence the Commissioners to choose the Tarte pier site.

That location, too, would remove many grain "tramps" from the upper port, thus remedying somewhat the present lack of wharfage space. Then, too, it would aid in vessels getting away to sea quicker. The freighters, which berth at Maisonneuve now, unload there and then come up to the city for their grain cargo. The big elevator there would permit loading and unloading at the present time.

The New Elevators.

The Grand Trunk elevator at Windmill Point is making rapid progress. Twelve of the "bins" are up full height now, and the foundations have been laid for sixteen more. The addition to the Harbor Commissioners' elevator No. 1 has been delayed a good deal by a strike among its carpenters, but the walls are

now up over thirty feet. It will be ready for next season's crop.

When all are finished, Montreal will have a storage capacity at the deep water line of 11,000,000 bushels.



EX-HARBOR COMMISSIONERS OF MONTREAL HONORED.

RECOGNITION in tangible form of the services of the late Harbor Commissioners was given at a gathering of the various commercial organizations recently, in the Canada Club, Montreal, when G. W. Stephens, C. C. Ballantyne and L. E. Geoffrion, were presented with three silver cups and heard much eulogy of their services.

Mr. Huntley R. Drummond presided, and explained that they were met together for the purpose of paying tribute to the late members of the Harbor Commission for what they had done for the port of Montreal. He would not enumerate what they had accomplished in the

way of constructing permanent piers, grain elevators, and the great floating dock, as those things were their own monuments as was suggested by the Latin inscription on the cups.

The Port Their Monument.

The port itself was the greatest and most lasting monument of the work that the first Harbor Commissioners of Montreal had carried out, but even more important was the example that these gentlemen had presented to the whole of Canada of a great task honestly, ably and impartially performed without fear or favor of any man or party; for, although appointed by the late Government, and belonging to that party, they had kept themselves free from any taint or suspicion of partiality towards their own political friends.

"I say that advisedly," said the chairman, "and being conscious of the fact that at the time when the present Government came into office there may have been some talk; but I have yet to hear

of any accusation being made that was in the least degree true." Mr. Drummond went on to say that when the new Government came into power, the late Harbor Commissioners had been requested

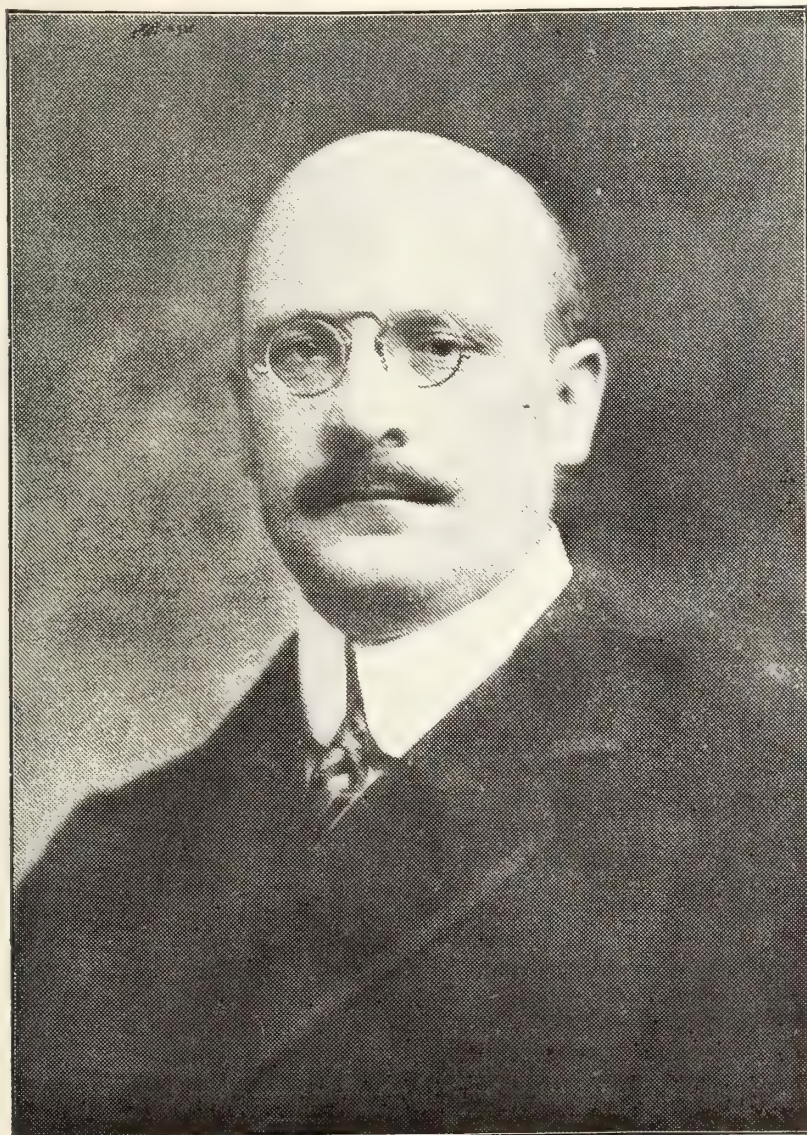


C. C. BALLANTYNE.
Late Member, Montreal Harbor Commission.

by the Hon. J. D. Hazen, Minister of Marine and Fisheries, to remain in office, and when they left it was of their free-will and with the esteem of the Government and of Montreal citizens.

Non-Political Policy.

The genius of their career was non-political, and he, as a Conservative, was



MAJOR G. W. STEPHENS.
Late Chairman Montreal Harbor Commission.



L. E. GEOFFRION.
Late Member, Montreal Harbor Commission

happy to admit that, and also that the action of the Minister of Marine was non-political. He himself had been a member of the deputation which waited

upon and urged the present Government to retain the late Commissioners, and the deputation which was mostly composed of Conservatives, was cordially received. Mr. Drummond expressed the hope that in the future the city and country would benefit in some other way by the services of the three ex-Commissioners.

Mr. Howard Murray and Col. Labelle, on behalf of the Manufacturers' Association and the Chambre de Commerce, then presented the cups to the late commissioners, in appreciation of their services.

Major Stephens Reply.

Major G. W. Stephens, in acknowledging the gift, expressed gratefulness to the business men of Montreal and also to the press, without whose hearty co-operation, he said, very little worth while could have been accomplished. "Upon the threshold of our public service," he said "six years ago we took over grave responsibilities, and undertook to fit ourselves to meet them. The Government that appointed us gave us a free hand to administer a public trust in the interests of all the citizens of Canada, unfettered by outside influence, political or otherwise.

Thus free, for five years, we gave to our country and fellow citizens the best we had, to give unreservedly. Mistakes were made, of course, as is natural, where human nature exists, and where great rival interests clash in their greed for privileges and opportunity."

Some of the credit for what had been done was due to the loyal harbor staff fired by patriotism, as well as the earnest co-operation of Montreal citizens. That, the late Commissioners should have followed in the footsteps of so many grand Canadians associated with the progress of this country, was honor enough.

The late chairman of the commissioners then enumerated a lengthy list of Canadian citizens who had made great sacrifice to serve their country, and mentioned among those who were especially entitled to the credit of making possible the development of the Canadian national waterway, the Hon. John Young, Hon. Israel Tarte, Hon. Raymond Prefontaine, and Hon. Louis Philip Brodeur. "We are proud," he concluded, "to have served our country, our city, and fellow-citizens for five years; and we are proud to have given over the work into the hands of the present commissioners, whose integrity and independence assure the future."

C. C. Ballantyne.

Mr. C. C. Ballantyne also acknowledged the co-operation of the harbor staff and of the public bodies, and said

that while the Government had pressed them to remain in office, they had felt that after six years of service the time had arrived when others should be given the opportunity, and he felt that everyone was pleased with the appointments that had ensued. The work was national, and he believed no one was inclined to allow politics to intrude.

L. E. Geoffrion.

Mr. L. E. Geoffrion, speaking in French, briefly but cordially thanked those present for their mark of confidence and esteem.

Following the speech-making the healths of the late commissioners, and also of the present commissioners were pledged.

Among those present at the gathering there were: Major H. R. Drummond, Major G. W. Stephens, C. C. Ballantyne, L. E. Geoffrion, G. W. Ross, Farquhar Robertson, Col. A. E. Labelle, Howard Murray, J. H. Sherrard, J. T. McBride, Jas. Roger, Wm. Finley, Col. Gardner, R. W. Reford, Anson McKim, W. I. Gear, Geo. Sumner, J. H. Gordon, Frank Posey, H. J. Lyman, J. Osler, Geo. Hadrill, David Seath, M.P., Fennell, and H. T. Meldrum.

The pieces of silver plate presented were massive silver bowls, inscribed with names and date of office, as being given by "representatives of trade organizations of the city in recognition of invaluable services rendered to the port," and there was added on each one the Latin motto: "Si momentum requiris circumspecte portum."

MANY SHIPS STRIKE.

THE St. Lawrence River and our inland lakes and rivers have a bad "hoodoo" again this year. A string of ships have come to grief already this season, and there are three months yet before the ice comes and blocks navigation. The most serious accidents occurred on one day when the Lake Manitoba crashed into the Isle of Orleans in a fog and damaged her bottom so badly that she had to go to New York to dry dock. The previous evening, the Crown of Cordova cut into a passenger ship, the Lady of Gaspe, injuring the latter so seriously that the captain had to run ashore. The Cordova had to drydock at Quebec with a hole in a bow plate. Then the Pretorian hit a submerged wreck while outward bound in the lower river and had to lose a trip.

On inland waters, Lake St. Louis holds the record for small disasters. The Majestic and the Whittaker went aground off Lachine, while recently the Stormount stuck fast off Dorval Island. The John Sharples staggered into port

one evening with a huge hole in her bottom, made when she hit a rock at Chicoutimi. Then the Duchess of York sheared into a rock while running the Lachine Rapids and made port in a serious condition.

Other more trivial accidents have occurred along the rivers at different places.

STEAMERS COLLIDE ON THE ST. LAWRENCE.

THE steamship Lady of Gaspe, which left Montreal about 4 o'clock on the afternoon of July 28, with more than a hundred passengers and a heavy cargo bound for Gulf of St. Lawrence ports, was badly damaged about midnight in collision with the steamer Crown of Cordova. The passengers and crew were all safely put ashore at Cap Magdalene in life-boats and cared for by formers.

The Crown of Cordova had left Montreal about ten minutes after the Lady of Gaspe, and overtook the latter, below Cap Magdalene, riding at anchor on account of the dense fog. The Crown of Cordova struck the other boat amidships, cutting a large hole, and Capt. Vesina of the Lady of Gaspe at once saw that the only hope of saving his ship was to drive her ashore. He ran her on to the beach and the passengers were taken off in the life-boats.

The Crown of Cordova, was on her way to Quebec to take on lumber for London. After telegraphing to Quebec for assistance she proceeded under her own steam, and was later met by the tug J. H. Hackett and assisted to port.

An inquiry into the cause of the disaster, and in order to apportion the blame has been held and concluded, but as we go to press, the decision has not been made public.

GRAIN CONGESTION AT MONTREAL.

ONE of the problems at present before the Montreal Harbor Commission, according to Mr. Farquhar Robertson, Commissioner, is the discovery of some means to prevent local grain elevators from being used as storage elevators by dealers who wish to wait for a rise in the market. Whether the solution would likely take the form of increase in storage rates after a certain number of days, or the placing of a time limit on the use of bins, Mr. Robertson was unable to say, but intimated that the matter would receive immediate consideration at the hands of the Commission, who could be depended upon to take whatever steps they thought necessary to prevent, in so far as was possible, the congestion of grain at this port.

LINES OF DEVELOPMENT FOR CANADIAN ROUTE.

IN his report to the Harbor Commission, Mr. W. G. Ross, the chairman, states that three broad lines of development are necessary on the Canadian route for grain, and that unless all three are looked after at once, Montreal and the St. Lawrence can never hope to cope with American cities. The necessary lines of development are:

- (1).—Ocean tonnage from Montreal.
- (2).—Storage capacity at lake and seaports.
- (3).—Canadian lake vessels.

Of the 44,510,182 bushels of wheat shipped from Fort William and Port Arthur via American ports in 1912, only 333,829 bushels were transported in Canadian-owned vessels. The Canadian marine lost this transportation to the American lower ports by its scarcity of vessels, a scarcity which a deep-water channel to the sea would soon not only make adequate, but would divert to Montreal and other Canadian ports the greater portion of the grain trade which now seeks American ports.

Until Canada has a westbound trade capable of supporting and warranting the building of vessels on a par with American boats, she cannot control the carrying trade from the upper lake ports, says Mr. Ross. Until Canada furnishes a deep-water channel to Montreal to tap her eastern coal fields, Americans will control the bulk of the grain shipments.

BRITISH WRECKS IN JUNE.

THE number and net tonnage of British vessels respecting whose loss reports were received at the Board of Trade during the month of June, 1913, and the number of lives lost are as follows:—

	Number.	Net Tonnage.	Lives. Lost
Sailing ...	25	1,034	2
Steam	13	9,600	2
Total	38	10,634	8

The above table is a record of "reports received" in the month, and not of wrecks which occurred during the month. Many of the reports received in June relate to casualties which occurred in previous months. The figures include the losses of 9 sailing vessels of 484 tons, and 4 steamers of 1,109 tons, belonging to British possessions abroad, involving the loss of the lives of 7 persons, of whom 1 was lost in a sailing vessel, and 6 in steamers. Casualties not resulting in total loss of vessels and the lives lost by such casualties are not included.

Trial Trip.—The Andania, built by Scott's Shipbuilding Co., Greenock, for

the Cunard Co., went to sea for her official trial trip recently. The vessel measures 540 ft. in length, 64 ft. in breadth, and 46 ft. in depth. Her tonnage is 13,300, and accommodation is provided for 2,140 passengers. The trial trip proved satisfactory.

TO BUILD POWER LIFE BOAT.

THE firm of V. M. Dafoe & Co., Vancouver, B.C., has secured the contract for the building of a power boat for service at Clayoquot, Vancouver Island, and will start construction at an early date. The boat will be 36 feet long, and 8 feet 7 inches broad, with a beam of 4 feet 2½ inches, and will be self-righting and self-bailing. She will be practically unsinkable, a row of air-tight compartments being provided on either side, and a series of bailing tubes for draining off the water taken aboard in rough seas.

The craft will be of the staunchest possible construction with gun-metal fittings throughout, and will be built of Honduras mahogany and white pine, carefully selected and planked diagonally. She will be equipped with a 25-horsepower engine with special magneto and ignition features. The cost of her construction will probably run about \$12,000.

She was designed by Capt. McLellan of the United States life-boat construction department, who has designed twelve similar craft for service in the American Republic. Ten of the United States boats are to be used on the Atlantic coast and two on the Pacific.

The boat has been ordered by the Dominion Marine and Fisheries Department.

COAL UNLOADER WRECKED.

STRUCK by the full force of a small cyclone, which cut a swath across the country on the night of August 21, and which heralded one of the worst electric storms in years, the new \$60,000 coal unloader, the construction of which had only been completed two hours previously, was blown down at the new Ontario dock, Sault Ste. Marie.

By almost a miracle there were no fatalities. A gang of five men was just about to approach the unloader, when the recollection of the way in which the lightning played around the steel work in a previous storm prompted them to remain in the adjacent office until the storm was over.

The unloader was of the double tramway type, and was one of the most up-to-date on the Great Lakes. With its great capacity it would have unloaded an 8,000 ton vessel in one day.

C.P.R. PUBLICITY AGENT.

AN official bulletin signed by G. M. Bosworth, vice-president of the C.P.R., and approved by Sir Thomas Shaughnessy, was issued at the Windsor Street offices, Montreal, a few days ago, announcing the appointment of John M. Gibbon to succeed W. T. Robson, resigned, in the office of general publicity agent.

Mr. Gibbon was born in Udewelle, Ceylon, of Scotch parents. He was educated at Aberdeen, Gottingen, and Oxford Universities, graduating at the latter. He studied art in Paris and later became the editor of the illustrated British publication, Black and White. He joined the London office of the C.P.R. six years ago to organize a European publicity office. He is the author of "Scots in Canada," and a popular history of Scottish settlement.

BRITAIN'S MERCANTILE SUPREMACY.

MORE than one-half of the mercantile tonnage of the whole world flies the British flag. Fifty years ago, the proportion was 56.4 per cent.; today it is 59.2 per cent. There were times during the intervening period when it was much greater, but the remarkable fact remains that all the other nations of the earth can only muster 40 per cent. of the world's shipping between them.

Taking steamships only, the British flag floats from the masthead of 60.5 per cent., thus leaving even less than 40 per cent. for the rest of the world to share.

ALLAN LINE IN WINTER.

THE Allan Line management report that a greatly improved winter service is to be inaugurated at the close of the present St. Lawrence season. There will be a weekly service to and from Glasgow, sailings from this side being alternately from Portland and Boston, instead of a fortnightly service as has been the case in previous winters. The service will be maintained by the following steamers: Grampian, Hesperian, Scandinavian, Scotian, and Ionian. The first sailing will be that of the Scandinavian from Portland on December 4.

Clyde Shipbuilding.—Although the output of the Clyde shipbuilding yards during July was interfered with by the fair holidays, the total was over 30,000 tons. This is considerably below the monthly average for the year to date, but the twelve months still promises to eclipse all records. The aggregate for the seven months is over 40,000 tons in excess of that for the corresponding period of last year.

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GRAIN STORAGE AND SHIPMENT INVESTIGATION.

NOT FOR a long time, if ever, in the realm of transportation by water, at least so far as Canada is concerned, has so thorough an investigation been carried out, and so complete a record of facts and figures been compiled and presented in so concise and telling a manner,

relative to the storage of grain, the feature product of the Prairies Provinces of our Dominion, as that just recently published for the guidance and general information of the Montreal Harbor Commission, towards their shaping a policy to meet the now known conditions, and, incidentally, to reflect the accruing benefits on the country as a whole.

The present chairman of the Montreal Harbor Commission, has shown himself to be a worthy successor to the previous appointee, Major G. W. Stephens, and, in passing, let us remark, that if example be still a potent factor in present-day civilization, then, the myriad nonentities who play only to the gallery in our municipal, political and public life generally can secure an object lesson by studying the activities and achievements of the past and present Montreal Harbor Commissions, individually and collectively. The policy of the old Board is being continued and further developed, and one has only to read the account of the recent tangible recognition of the work of that body, which appears on another page of this issue of Marine Engineering of Canada, to note the unanimity which men of all shades of opinion, political and otherwise, displayed in recognizing the personal worth of its individual components.

An ultimate settlement of the vexed question of shipping Canadian-grown grain to American ports, in American bottoms, and thence by American railroads for ocean shipment to consumer was undoubtedly the object aimed at in pursuing the investigation, and, it is neither a straining of the imagination nor an attempt to assume the role of a prophet, on the part of those who are directly interested, to express their firm conviction that a reversal of existing transportation conditions has, as a result of the data collected, become imminent, and a near future certain accomplishment. The very reliability, not to speak of the long felt necessity of the information collected, will awaken to a new ideal and purpose, the many interests involved, and direct more than will the creation of a Canadian Navy on our shores, increased regard for and attention to the kindred industries of marine engineering and shipbuilding. Elevator accommodation has been found to be hopelessly deficient, in spite of the many fine structures of this nature to be found at our principal ports, and last, but in nowise least, the need for an ocean vessel waterway from our Great Lakes to the sea is pointed out in no uncertain manner.

The lack of return cargoes westward is a feature referred to in the report, and is a question which gives added point to the argument for deep waterway construction from lake to ocean. The coal and iron industries of our Eastern Provinces do not play that part in the development and upbuilding of the West which we have a right to expect, and which they can perform quite as fitly as those on the American side; and, certainly, so long as dependence on railroad transportation beyond and west of Montreal, or the reshipment of coal at that port from ocean vessel to Lachine Canal Packet, are disabilities allowed to exist and prevail, just so long will that reciprocity of mutual benefit between our provinces be denied birth.

We hope to see during the coming off-season of navigation on our lakes and rivers, a comprehensive scheme launched by those having the matter in hand, whereby the altogether humiliating conditions existent will, for the most part, if not entirely, cease. There is no question as to the capacity of the men who are sponsors for the undertaking, stupendous, even though it appear, and neither money nor really influential support will be lacking in bringing to an end what is meantime a national reproach.

MARINE NEWS FROM EVERY SOURCE

William Gilbert, Government light-keeper and storm signal agent at Wiar-ton, Ont., for six years, died recently, aged 85 years.

Vancouver, B.C.—The Dominion Government has awarded the Vancouver Ship Yard Limited, the contract for the construction of three gasoline launches.

Edmund Bristol, M.P., and Grant Morden have retired in favor of J. M. Norcross, of Toronto, and J. P. Steedman, of Hamilton, from the Richelieu directorate.

Ottawa, Ont.—The contract for a modern power lifeboat, it is expected, will be awarded to V. M. Dafoe, of Vancouver, the price mentioned being in the neighborhood of \$10,000.

Ottawa, Ont.—Departmental engineers have been asked to report on an application for a subsidy for a drydock and repair plant to cost upwards of \$2,000,000, at Vancouver, B.C.

Sarnia, Ont.—The Northern Navigation Co., has just completed a plant at Port Edward, Ont., costing \$50,000. It includes a laundry and an up-to-date refrigeration plant for storing food.

Vancouver Harbor, B.C.—At a Cabinet meeting held in Ottawa, on August 8, the new Vancouver Harbor Commissioners were appointed as follows: Hon. F. Carter-Cotton, Capt. Fullerton and S. McClay.

Amherstburg, Ont.—The steamer Maritana of the Pittsburg Co. fleet lost a propeller blade while passing up Ballard's Reef channel on August 20, and was forced to go to the Great Lakes Engineering Works for repairs.

Sarnia, Ont.—A number of old piers that have become submerged are reported along the Canadian side of the river. An effort will be made to have them removed, as they are a menace both to American and Canadian shipping.

Victoria, B.C.—Smashing her own record by at least 10 hours, the 20 knot C. P. R. turbine liner Empress of Russia reached port at 3 a.m., August 2, on her second voyage from the Orient. This sets a new mark of 17 days 18 hours from Yokohama.

Transatlantic Record.—A new record, three days and nineteen hours from land to land for trans-Atlantic travel, has been established. The vessel, which has just cut several hours off previous records is the Royal George, the fastest ship in the line of the Canadian Northern Railroad Co.

New Westminster, B.C.—The Department of Public Works will erect two new wharves, work to start at once—one on Pitt River, 40 x 60 feet, and with 180 feet approach, and one at Baruston Island, same size. The contract for dredging Pitt River has been let to the Pacific Dredging Co.

Montreal, Que.—The Customs returns for July, 1913, \$2,529,201, constitute a new record in the history of the port, showing an increase of \$277,542.55 over the returns for the corresponding month of 1912, and an increase of \$133,124.57 over the previous record, which was made in May of this year.

Sarnia, Ont.—The ship graveyard in Sarnia Bay is considered a menace to navigation. The attention of the Department of Marine and Fisheries has been called to the number of useless old wrecks rotting away there. When a vessel becomes useless she is usually towed into the bay and left there.

Chatham, Ont.—During the month of July, Customs receipts at the port of Chatham total \$41,271.59, which is over thirteen thousand more than for July, 1912. Almost every sub-port in the district shows an increase for the month. The local collector, D. R. Farquharson, is authority for the statement that this is a record for collections here.

Levis, 'Que.—The Dominion Coal Co. liner Wabana, which has been repairing at the Levis graving dock of Messrs. Davis & Sons, was undocked recently, with all repairs executed, after being in the dock 32 consecutive days, inclusive of five Sundays. The Wabana grounded in the St. Lawrence below Matane, while bound from Sydney to Montreal with coal.

Ottawa, Ont.—The Cabinet Council awarded the following contracts on July 31: To the Pacific Dredging Co. at Pitt River, B.C., \$158,220; to Broley and

Martin, New Westminster, B.C., for completion of the jetty at Stevestin, B.C., \$83,500; to Piersin U. Bar Co., for greenhouses and hot water heating in connection with experimental farm, \$19,447.

New Westminster, B.C.—The fishery protection boat "Restless," Captain Moore, has cleared from New Westminster harbor for up coast where she will remain all season assisting in patrol and inspection work. She will run straight to Alert Bay, and for a month or so this will be her headquarters, while taking the government overseers over the fishing grounds of the district, and later will go even further northward.

Sarnia, Ont.—The concrete foundation for the new light station on Ecorse Point, St. Clair River, has been completed. Because of the fact that passing steamers have refused to slow down, the construction crew experienced great difficulty, as, time and again, both material and equipment were washed away. The steel superstructure has also been completed, and is now ready to receive the illuminating apparatus.

Coquitlam, B.C.—L. D. Shafner, president and managing director of the Coquitlam Shipbuilding and Marine Railway Co., Ltd., has received official information that their tender for the new snag-boat required by the Dominion Government to take the place of the Samson on the Fraser River, has been accepted. The contract price is \$21,000. The snagboat will be 111 feet long and 30 feet wide, and will be designed on the lines of the old Samson.

Montreal, Que.—A new grain elevator especially for export trade, with a capacity of nearly three million bushels, will be built by the Harbor Commissioners. This will bring the total capacity of the elevators of the port to 10,732,000 bushels. Although the site has not been decided upon, it was announced by an official of the Harbor Commissioners that the new elevator will be situated in the east end in such a way that boats can be unloaded on one side and loaded on the other.

The Allan Line has recently been able to dispose of two of its single-screw

steamships. These are first, the Hungarian, built in 1902 at Glasgow by Napier & Miller. She is a vessel of 4,508 tons gross register, fitted with a set of triple-expansion engines by Duns-muir & Jackson. The other is the Ontarian, a couple of hundred tons smaller. She was built at Port Glasgow by Robert Duncan & Co., in the year 1900. The last-named vessel is, it is understood, purchased by the Chargeurs Reunis of Havre.

Ice-Breaker for St. Lawrence.—The Minister of Marine and Fisheries has decided to order another ice-breaking steamer for the St. Lawrence, about 275 feet long, 57½ feet beam, and 30 feet deep, drawing 20 feet, with engines of 8,000 indicated horse power. It is proposed to make the form forward similar to that of the celebrated Russian ice-breaker, Ermack.

Prince Rupert, B.C.—Operations have commenced on the Prince Rupert dry-dock buildings by the Wineland Construction Co., Vancouver, general contractors. The work includes the power house, 104 x 108 feet, with steel frame chimney of fireproof construction, 11 ft. in diameter, and 200 ft. in height; a shipbuilding shed, 160 x 300 feet, with 10-ton travelling crane; boiler and blacksmith shop, 76 x 150 feet, with concrete flooring; 15-ton travelling crane; six 400 h.p. water tube boilers; a machine shop, 76 x 150 feet, with complete equipment of tools.

Halifax, N.S.—After an absence of fifty-four years from Halifax, its birth-place, the Cunard Line will once more return to the home of its nativity. A cablegram received at the local office of Cunard & Co., is to the effect that the ships of the line which have during the past two summers conducted a service between Southampton and St. Lawrence ports will make Halifax a port of call. The magnificent new liners Andania and Araunia, launched this year and constructed especially for the Canadian service, will call at Halifax during the coming winter season.

Great Lakes and Gulf of Mexico.—The first regular waterway service between the Great Lakes and the Gulf of Mexico will be inaugurated by September 1, according to the plans announced of a Chicago Transportation Co. The proposed service will be for both passenger and freight. The plans of the company provide for transporting freight and passengers from Chicago to La Salle, Ill., by barges, routed through the drainage canal and the Illinois and Michigan Canal. At La Salle a transfer will be made from the barges to steamers, which will continue down the

Illinois and Mississippi Rivers to New Orleans.

Privy Council Judgment.—A cable received from Francis King, K.C., of Kingston, Ont., states that the Privy Council has rendered judgment relieving the steamer Kinmount of the Montreal Transportation Company and Mount Stephen of the Inland Navigation Co. from all damages entailed to the Meaford Elevator Co. for injuries caused to its elevator through disturbance of the water when the Kinmount entered the river at Goderich and passed the Mount Stephen at the elevator with the leg in her hatches. Several damage cases resulted, and both companies were held liable in the Canadian courts.

Smith's Dock Co., South Bank-on-Tees, England, recently launched the Keyvive; 250 by 42.6 by 20 ft. Built for service on the Great Lakes and the St. Lawrence. The vessel is classed to Lloyd's Register, and carries a dead-weight of about 2300 tons on the light draught necessary for going through the Welland Canal. She is of the usual lake steamer type with machinery aft, and is fitted with four special steam winches, steam windlass, and steam steering-gear, with the usual cargo derricks. The machinery, also being constructed by Messrs. Smith's Dock Co., will consist of engines with cylinders 16, 26, and 43 in., by 33 in. stroke, and two boilers.

Capt. J. McCannell is now commodore of the C.P.R. upper lakes fleet, and flies his pennant on the steamer Assiniboia. The reason for the shift lies in the fact that about a fortnight ago Capt. Louis Pyette, the commodore, was stricken with a partial paralysis which made it impossible for him to retain the command or in fact to sail the vessel. As a consequence Capt. McCannell of the Athabasca became captain of the flagship, and the place vacated by him went to Capt. Jack B. Currie, who is very popular in the fleet. Capt. Pyette is now in Owen Sound, and hopes to be able to yet resume his seafaring duties, and his many friends will hope for the speedy return of his usual robust health.

Amherstburg, Ont. — With the completion of dredging work in Ballard's Reef channel in the lower Detroit River, next summer navigation interests on the great lakes will be given a 600-foot channel, with a mean depth of 21 feet at low water. During the last week of the present month, the United States Engineers' Department will begin work on the western half of the channel, making the last step in the work, which has been in progress for several years. The completed channel will be a mile and a half long. At present all up-bound ves-

sels have been taking the westerly channel while the work was in progress in the easterly. Notice has been given that after August 23 all vessels might ply in the other half of the channel and be guided by buoys, which will be moved to the proper places, instead of the Malden Ranges on shore.

Fort William, Ont.—The new terminal elevator being built for the Fort William Elevator Co. at West Fort William is fast assuming a finished appearance. The building when completed will be one of the most modern and up-to-date grain handling plants on the Continent. The storage house consists of 48 round tanks and 35 interspace bins, 90 feet in height, with a capacity of 1,500,000 bushels. The work house portion contains 32 circular bins and 16 outer-space bins, with a capacity of 500,000 bushels, so that the total capacity of the elevator will be 2,000,000 bushels. The special feature of the elevator is the drying plant to be used for the treatment of tough or damp wheat, 1,000 bushels of grain per hour can be put through the drying process without difficulty. The big terminal elevator of the Dominion Government, with a capacity of 3,500,000 bushels, is nearing completion, and will be used to assist in handling this year's crop.



OIL CARGO KEPT HER AFLOAT.

A CALCUTTA daily paper is responsible for an extraordinary story told to its representative by Captain Burn, of the oil steamer Saranac, belonging to the Tank Storage and Carriage Co.

She was laden with 6,300 tons of oil from New York for Calcutta. On May 28th, when seven miles from Point de Galle, Ceylon, and three miles out from shore, she struck an uncharted rock three times, and it was found that two of the tanks in the middle of the ship were letting in water. Water came in and lifted the oil to the top of the tank, and there it stopped, and in this condition the vessel was navigated up to Calcutta, a journey which took five days.

When the cargo of oil had been pumped out the vessel went into dry dock, and it was only then that the extent of the damage was discovered. Fore and aft were two huge rents in the plates, many of which had been started, and in the middle of the hull was a gash 20 ft. long and 1 in. wide, while here and there were huge dents big enough for a man to put his head through. Any ordinary steamer so damaged would have gone down in a very short while, but in the case of the Saranac the oil kept the water out, and, according to the captain, the vessel floated almost as well as though nothing had happened.

North Atlantic Ice Patrol Reports for the Season of 1913

Being Statistics and "Deductions" from observations made by the United States Revenue Cutter, "Seneca," Captain C. E. Johnston, while cruising in the Ice Region, from May 31 to June 16, 1913. We are indebted to the Hydrographic Bulletin for the data.

ALL of the ice seen on or near the

Grand Bank this season has been of the Greenland type in berg form. No ice of the field or slob variety was seen or reported, except near the coast of Newfoundland. During the month of April I had reports of about 100 bergs south of latitude 50 degrees north, mostly in a congested area around Flemish Cap, and thence westward to the Grand Bank. Scattering bergs were reported as far east as 48 degrees 50 feet N., 40 degrees 40 feet W.; south to 44 degrees 07 feet N., 48 degrees 32 feet W.; west to 44 degrees 50 feet N., 49 degrees 10 feet W. In May there were reported to me 114 bergs south of latitude 50 degrees. They had moved westward and southward, and were mostly on or near the eastern side of the Grand Bank, many being grounded thereon; eastern limit for May, 48 degrees N., 40 degrees 18 feet W.; southern limit, 43 degrees 18 feet N., 48 degrees 33 feet W.; western limit, 44 degrees 56 feet N., 49 degrees 16 feet W.

Up to June 16, I had reports for that month of 35 bergs south of latitude 50 degrees, mostly confined between 48 degrees and 49 degrees N., 45 degrees and 50 degrees W. A few scattering bergs were reported as far east as 49 degrees 30 feet N., 41 degrees 45 feet W.; south to 43 degrees 02 feet N., 42 degrees 49 W.; west to 48 degrees 28 feet N., 49 degrees 33 feet W. Many bergs were reported off St. Johns, Newfoundland, and grounded near that port. Throughout the season there have been reports of numerous bergs north of 50 degrees, but I have kept no account of them.

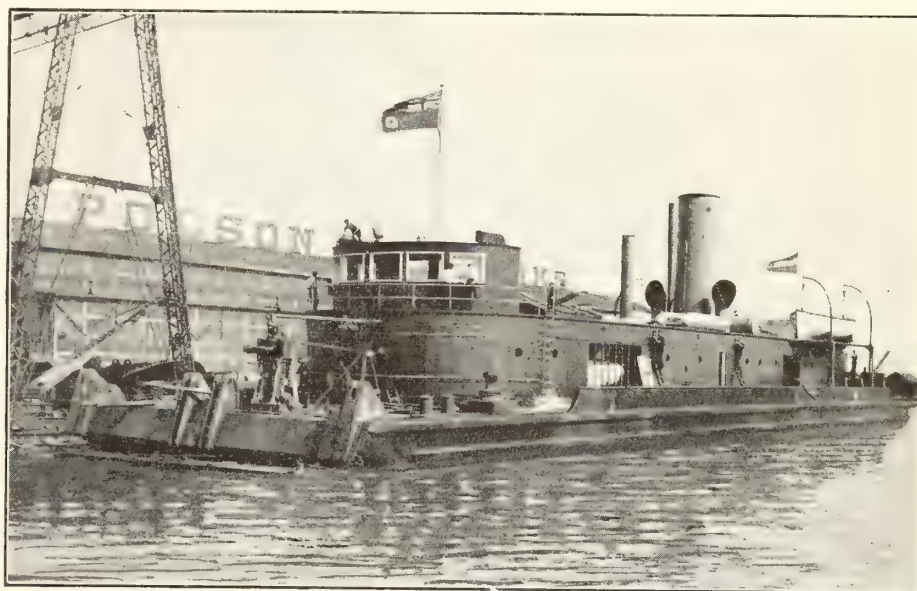
The largest berg we saw was about 400 feet long by 300 feet wide by 70 feet high out of water; the smallest was about 225 feet long, 100 feet wide, and 35 feet high. All were white in color, some having one or more distinct veins of blue ice running through them, these veins ranging from 18 inches to 6 feet in width. As to shape no two bore any striking resemblance to each other. There were round tops, flat tops, sloping tops, and pinnacled tops; sloping sides, sheer sides, craggy sides; regular shapes and extremely irregular shapes. The only type we did not see is the kind popularly pictured in school books, with high, overhanging, craggy pinnacles. I have read in recent newspapers of ships reporting bergs half a mile long and 300 feet high. I am not prepared to refute such statements, but we saw nothing of that size. I estimate 150 feet

as the highest berg we saw. It looked at a distance like the pictures of Matterhorn.

Visibility of Ice and Means of Detecting Its Presence.

The greatest distance we observed ice was 18 miles. The day was clear, with light easterly winds, and a tendency to mirage. It seemed to suddenly jump into view, and could be plainly seen from the bridge as soon as from the crow's nest. On ordinary clear days

found that an observer standing behind or under the beam could see practically nothing, but that 15 feet away to one side he could see readily. With the beam turned on a berg abreast the ship and 2 miles away, I could see it as plainly as an illuminated store front from the quarterdeck, about 100 feet abaft the light. Another point to be noted is that the beam must be drawn to a fine focus. A flaring beam blinds the observer. Owing to the binding



HYDRAULIC SUCTION DREDGE "PORT NELSON" READY FOR HER TRIP TO HUDSON BAY.

the average berg can be seen 12 to 15 miles from the bridge, about a mile farther from the crow's nest, and a mile still farther from the signal yard. On a cloudy day, with good visibility, deduct about 2 miles from the foregoing. In clear weather, with hazy horizon, we have seen a big berg 11 miles, its top being visible well above the horizon; in light fog, 2 miles; dense fog, 200 yards; drizzling rain, $2\frac{1}{2}$ miles. In bright moonlight, with naked eye, $2\frac{1}{2}$ miles; moon shining through thin mackerel clouds, 2 miles; starlight, 1 mile with naked eye, 2 miles with glasses; overcast and dark, but with horizon visible, one-half mile with glasses. In the last case, the berg looms up dark; in the other cases its effulgence shows lighter than the surrounding space.

With the searchlight we were able to see a berg about 3 miles on a dimly moonlight night, and 2 miles after the moon set. In using the searchlight, we

effect of a searchlight on the observer, I should not recommend its general use for a vessel under way. On a dark night or in thick weather a vessel in the vicinity of bergs should slow so as to be able to manoeuvre within the limit of visibility.

A berg may or may not give an echo. If its sides are steep or perpendicular an echo will probably be heard from some directions, but not from others, according as the face presented to the ship is normal or slanting. Any slanting face will reflect sound away. We were not successful in getting echo farther than half a mile. About 90 per cent. of our attempts were without result. The existence of an echo indicates an obstruction, but its absence proves nothing. In one case we were between a berg and a growler; the growler gave an echo, but the berg none.

Sudden changes of temperature mean nothing, so far as bergs are concerned. The sea water is streaky, as a rule, and

where its temperature is constant we found no change up to a ship's length of a berg. The coldest water we found was 31 degrees. Surface temperatures are about 2 degrees higher than the injection. Close to a berg the water at surface falls from 2 degrees to 4 degrees. With a maximum and minimum thermometer, we found no change from temperature of injection down as far as 20 fathoms. At 30 fathoms the pressure broke the bulb of the thermometer. In a light low fog an observer can see a berg from aloft sooner than from deck, but in a dense fog we found that the lookout was best kept from the spar deck, as the first sight of the berg was the leaping of the water on its base.

Speaking about lookouts, it occurs to me that on a very large ship, with decks some 70 feet above water, bridge some 20 feet higher, and lookout posted higher up still, the lookout might well be higher than the top of a small berg; and hence on a dark night he would have an unobstructed view of the horizon over a berg half a mile or a mile away. In that case he might easily miss seeing the obstruction until too late to avoid it. As a rule, we found little or no change in temperature of the air near a berg.

Sea Birds.

As to birds, I make little claim to expert knowledge of ornithology, but to the best of my judgment these are all the birds we have seen in the ice regions:

One puffin and three mallard ducks, flying, and not near any berg; hagdon gulls in large numbers, singly and in flocks, some around bergs, but more likely to be near some fishing vessel; Arctic fulmar, plentiful, singly or in small flocks, cruising about everywhere, irrespective of bergs; petrel, two varieties in small numbers, following ships or resting on bergs; jaeger, few, usually near some fisherman; plover, few, around bergs (probably lost in fog); Arctic tern, plentiful in May, few in June, near bergs; red phalarope, few, around bergs; lesser auk, few, around bergs; murre, large species, in great flocks around bergs in May, few of a smaller species in June; no gulls of the ordinary harbor, herring, or kittiwake varieties. In some instances a berg would be literally covered with birds, and again there might not be a bird in sight. I should regard the presence of murre as indicative of bergs, but should pay no attention to the others.

We saw an occasional whale or black-fish and several schools of porpoise, mostly in or near the Gulf Stream. We saw only two hair seals, and they were on the fish banks. A seal would have a hard time climbing upon the average berg or of staying there if he once got

up. The presence of growlers or small chunks of ice indicate a berg to windward. The roar of breakers on a berg and the rumbling of breaking ice can be heard as far as a mile on a calm day.

Behavior of Ice, Its Drift, etc.

So far as our observations went, the bergs drifted with the surface currents. Where two currents meet, the dominant one eventually takes charge. Disintegration of bergs takes place slowly in water of 34 degrees or below. At 36 degrees, melting and erosion are quite noticeable, and at 50 degrees the changes can be noticed from hour to hour. We had under observation for several days two bergs as they approached the Gulf Stream. Both turned over the day they entered the warm water, showing that melting of the underwater body was going on more rapidly than above. I estimated the daily diminution at 5 per cent. in water of temperature 50 degrees. Melting above water is going on slowly all the time, the water trickling down the declivities in small streams. One large berg had a small waterfall on one side under which it would have been practicable to hold a boat for the purpose of watering ship. The temperature of the air was 48 degrees.

As stated in a previous report, erosion takes place by water dashing up on slanting sides of bergs, and by scoring out the water line of steep sides. In the first case, the ice is disintegrated by sloughing, and in the second, by calving. Large fissures may be seen at times in the sides of bergs, and as these increase in size, great chunks are likely to fall off in the form of growlers. At the rate of 5 per cent. disintegration a day, a berg would last only about 20 days in the Gulf Stream; but the larger the berg the slower it seems to melt, and I have no doubt some of the largest would last two months.

The southern movement along the east side of the bank seems to be largely a matter of weather conditions. For many days the bergs remained almost stationary between Flemish Cap and the Bank, then, after a northerly blow with heavy northerly swell, they started to the south-west. Many grounded on the Bank, while others continued south. The highest daily movement we observed was 32 miles in 24 hours, in the vicinity of 44 degrees N., where the Bank rises quite abruptly from 1,000 to 21 fathoms. Ten miles farther east, another berg moved south only 6 miles the same day. As they approached the northern arm of the Gulf Stream, both of these bergs curved eastward. Fog and high winds then shut them from view. Six days later the westernmost one was seen again, about 12 miles

N.N.E. of the position where it entered the influence of the Gulf Stream. I presume both of these bergs melted early in June. After running southward for about two weeks, the current was overcome by a spell of south-westerly wind, and the bergs then returned to the north, all but one which was grounded in a deep pocket near parallel 45 degs., where it broke in two some 10 days later, and floated away in two pieces.

In the matter of currents, it seems that the winter cold stream comes down the coast of Newfoundland, and at the north end of the Grand Bank it splits in two, one part running between the Bank and the island to the west and south, while the other follows the general trend of the east side of the Bank. The current running out of St. Lawrence Bay joins the branch first mentioned, and accelerates its movement to the southward. Between the tail of the Bank and the Gulf Stream, about 2 degrees farther south, there is much rough water, caused, no doubt, by the conflict of the two currents. Here is where the bergs usually change direction in April or May, as the Gulf becomes stronger than the Labrador Current, and are carried back northward.

From my observations of the effect of winds upon currents, I conclude that a cold winter, which is always accompanied by much northerly wind, sets up a strong southerly current, and the bergs go far south; a warm or mild winter, on the other hand, is accompanied by much southerly wind, which weakens the Labrador Current and strengthens the Gulf Stream, and as a consequence the bergs do not go far south. This theory is borne out by the seasons of 1912 and 1913. The first was a very cold and stormy winter, while the second was a mild season, its gales being largely from the south-west. The first was the worst season in many years for icebergs around the tail of the Bank, while the second was one of the lightest on record, only two bergs having been reported south of latitude 43 degrees. My observation of currents on the Grand Bank is that they are almost wholly tidal. In a general way they flood to the northward and ebb to the southward. Winds drive them to the eastward or westward, sometimes overcoming the strength of the tidal current.

The weather this spring has been mild, with much fog. In April we had about 50 per cent., May 60 per cent., and June about 30 per cent. of foggy days. In April, there were 2 days of wind over a force of 8; May 3 days, and up to June 16 only 1 day. We have had much ground swell, the swell being entirely out of proportion to local winds. I have anchored all over the eastern side of the bank, using bower anchor

and about twice as much chain as the depth of water. In heavy winds we drag some, but there is plenty of room and the bottom is hard and smooth. I tried a kedge, but it was little better than nothing.

The signs of the proximity of ice seem to be more applicable to ice fields than to bergs. I have seen most of those phenomena around the ice floes of Behring Sea and the Arctic, but none around the bergs. The only blink I have seen this year was when we were in the western edge of the Gulf Stream looking westward over water about 20 degrees colder. For a distance of about 30 degrees along the horizon there was a perceptible blink, rising about 1 degree above the horizon. I have spent two seasons around the Arctic ice floes, and I am prepared to say that this blink was in every way similar to the ice blink, except that there was no ice under it, only cold water. This would seem to indicate that the blink is a phenomenon of refraction rather than of reflection. This point would seem to be further borne out by the fact that as an ice floe is approached, the blink usually turns into a mirage.

Safety in Ice Regions.

In my opinion the only safe way to navigate regions of icebergs is to stop during thick weather, and to run very

berg the helm should be shifted in order to throw the stern away from the berg. At night, and in thick fog, I should post the lookout as low down as circumstances would permit. In addition to this, the vigilance of the officer of the watch should be unremitting.

Soundings on Grand Bank.

I have found that little reliance can be placed on the charts of the Grand Bank so far as concerns soundings. The 30-fathom bank south of latitude 45 degrees seems to be getting shoaler, particularly on its west side; the tail of the Bank shows deeper water than we found. On the east side of the Bank at latitude 45 degrees we found a deep indentation with no bottom at 100 fathoms near longitude 49 degrees and 50 fathoms as far west as 49 degrees 15 feet. On the west side of the Bank near latitude 45 degrees we got a sounding in 22 fathoms, but owing to foggy conditions I am unable to locate it with any degree of accuracy. I believe that the bergs are scouring out part of the east side of the Bank, and that the sand dug out is piling up in other places. I do not believe that bergs bring down any considerable quantity of solid matter, but it is doubtless true that the melting of field ice deposits a considerable amount of sand, gravel and earth.

FLOATING DOCK FOR THE UPPER BOSPHORUS.

TELEGRAPHIC news was recently received that the large floating dock built by Swan, Hunter & Wigham Richardson, Ltd., and owned by the Societe Anonyme des Docks et Ateliers du Haut-Bosphore had safely arrived at its destination, namely, Stenia in the Upper Bosphorus. The dock is 490 ft. long, 95 ft. broad, and has a lifting capacity of 8,500 tons. It is of the bolted sectional type which combines the advantages of the great longitudinal strength of a box type of dock with facility for self-docking.

The dock in question has two side walls and has been built in three sections, each of which is really a complete box dock, i.e., the walls are permanently joined with the bottom pontoon. When it is required to repair the underwater portions of the dock, the three sections are disconnected, and any two of them can lift the third section. The inside of the water compartments of the dock and the exterior parts below the water-line have been coated with Cail's Bitmo to prevent corrosion of the steel. There is an installation of powerful centrifugal steam pumps which can lift the dock with its maximum load in about four hours. The boilers for the pumping plant are placed in the house



8,500 TON SELF-DOCKING FLOATING DOCK BUILT BY SWAN, HUNTER & WIGHAM RICHARDSON, WALLSEND - ON - TYNE, BEING TOWED TO STENIA IN THE UPPER BOSPHORUS.

slowly on dark nights. In clear weather icebergs are not dangerous. I believe that a vessel might drift against a berg in ordinary weather without much damage. The British steamer Mount Temple is the only one I have heard of this season that sustained any considerable damage from icebergs. She is reported to have drifted against one while stopped during a fog. In sheering to avoid a berg it must be borne in mind that with engines working ahead the vessel is pivoted on her stem, so that as soon as the bow is clear of the

Fishing on Grand Bank.

We had no success in catching fish anywhere on the Bank. The French fishermen used trawls with a thousand hooks on a line and bait with clams, whelks, and colored rags. They report a poor season thus far, but look for good fishing in July, August, and September. They lie at anchor most of the time. My observation is that bergs of ordinary size will ground in 35 fathoms, so that none but the very smallest will ever get upon the shoal parts of the Bank where fishing is carried on.

on the top deck of the starboard wall.

The dock was ready for delivery to its owners more than a year ago, but owing to the continuance of the war between Italy and Turkey a safe passage through the Mediterranean and Aegean seas could not be guaranteed. No sooner had the fight over Tripoli been settled when the outbreak of hostilities in the Balkan States was in full swing, which again caused the dock to be kept in the River Tyne awaiting more peaceful times. It is gratifying that the dock has at last reached its destination safely.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Captain Rennie of the Allan Liner *Tunisian* has been promoted to the command of the *Virginian*.

Captain Cook, of the Allan Liner *Corican* becomes commander of the same company's steamer *Victorian*.

Captain Outram of the Allan Line steamship *Victorian*, takes command of the *Alsatian* now completing on the Clyde.

H. M. Kersey, of London, England, has been appointed general manager of the C.P.R. Trans-Atlantic and Trans-Pacific fleets.

Captain Alexander Creighton, who was port warden in Montreal city for seven years, died in London, Eng., on August 5.

Capt. Foster, commander of the R.M. S. *Empress of Ireland*, will probably be appointed C.P.R. marine superintendent at Liverpool.

Captain Gamble, of the Allan Line steamship *Virginian*, has been promoted to the command of the *Calgarian*, now completing on the Clyde.

W. F. Toner, who has held the position of landing waiter and harbormaster at Collingwood for the past four years, has tendered his resignation.

Capt. Walsh, C.P.R. Marine Superintendent at Montreal, will remain in charge at that port, instead of becoming marine superintendent at Liverpool as rumored.

Robert Sample, a Levis navigator, passed away at the age of 89 years. Deceased many years ago was captain on one of the old boats of the Quebec & Levis Ferry Co.

Arthur Piers, after twenty years' connection with the steamship end of the

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balacava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William St., Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy St., Kingston, Ont.; Captain James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

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Secretary—Jas. Morrison, Montreal.

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Secretary—M. R. Nelson, New York. . . .

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President—A. A. Allan, Montreal; Manager and Secretary—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

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Neil J. Morrison, P.O. Box 238, St. John, N.B., Grand Secretary-Treasurer.
Jno. A. Murphy, Midland, Ont., Grand Conductor.
George Bourret, Sorel, P.Q., Grand Door-keeper.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

C.P.R., has retired. In 1891 Mr. Piers was put in charge of the Pacific steamship lines. In 1893 he took over the C. P.R. steamers on the lakes, and in 1903 organized the C.P.R. Atlantic service. He reached the age limit some time ago.

J. E. Dalrymple, one of the vice-presidents of the Grand Trunk Railway, and head of the traffic department at Montreal, has left the service of the G. T.R. to become vice-president of the Northern Navigation Co., to which position he has been chosen. Mr. Dalrymple will still have his offices in Montreal.

Ald. Edward Bennett, of Kingston, Ont., has been offered the position of superintendent of the new government elevator at Fort William at a salary of \$2,500 a year. He has been employed with the Montreal Transportation Co. Kingston, for about 24 years, and for many years has been foreman at the elevator.

Andrew Weir has withdrawn from the Vancouver service, and his vessels will no more be seen loading there for the Orient and Australia, as in former years. The Weir steamers plied regularly from Vancouver to the Orient and Australia, but they have been gradually withdrawn, and are now employed on better trade routes, where competition is less keen and rates keep steadier on the profit side.

Senor Carlos F. DeBerna, general agent for the Pacific Coast of the Peruvian Steamship and Floating Dock Co. of Callao, Peru, was in Vancouver recently on a tour of inquiry as to the feasibility of making Vancouver the northern terminal port for a proposed new line of steamships. He believes that the coast trade could be developed very largely, and that there is a market for many British Columbia products in the cities of South America.

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto,	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John,	2	H. E. Berry,		G. T. G. Blewett,	36 Murray Street, St. John, N.B.
Collingwood,	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex. McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	Andrew T. Roy,	1212 Burrard St.,	F. Read,	859 Thurlow St.
Levis,	8	Helaire Mercier,	3 St. Joseph St.	S. G. Guenard,	Lauson, Levis, P.Q.
Sorel,	9	Geo. Gendron,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	W. Robertson,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor,	11	Alex. McDonald,	28 Crawford Ave,	Neil Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,		Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault Ste. Marie,	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown,	15	J. F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottetown, P.E.I.
Quebec City,	16	Arthur Abbey,	Fort William, Ont.	John A. Smith,	Fort William, Ont.

C.P.R. TURBINE STEAMSHIP "ST. GEORGE."

THE twenty-four knot turbine steamer St. George, which is to be operated on the Bay of Fundy, between Digby and St. John, in the C. P. R. scheme for reducing the time of the trip, arrived at Halifax on August 2, after a stormy passage, under convoy of the Liverpool Blackcock. The St. George's bunker capacity was not deemed sufficient to enable her to cross the Atlantic, and the Blackcock, the most powerful tug in Great Britain, was chartered to tow her across. Bad weather was encountered all the way, and when 150 miles off St. John, the Blackcock slipped her hawser and ran in for coal, the St. George subsequently coming in under her own steam. She made the trip from St. John to Halifax without assistance from her convoy.

The St. George is very luxuriously equipped, and will make the passage across the Bay of Fundy in less than two hours, about half the time at present occupied. She can carry 1,100 passengers.

**"LAKE MANITOBA" STRANDING.**

THE Court of Inquiry at Quebec into the grounding of the C.P.R. steamer "Lake Manitoba" on July 28, on the

Island of Orleans, rendered the following judgment on August 14, suspending Pilot Adjutor Lachance for the balance of the season. Lachance, it may be noted, is the president of the Corporation of Pilots, and was one of the Commissioners appointed to inquire into the state of the pilotage of the St. Lawrence last spring:

The Judgement.

"The court, after carefully reviewing the evidence adduced, unanimously unites in its opinion that the cause of the casualty was entirely due to the negligence of Adjutor Lachance, the pilot, inasmuch as he totally disregarded the rule of the road in porting for a bright light on his port bow, and also in not being aware of the exact position of his vessel with regard to the land. Moreover, circumstances ultimately proved that there was not sufficient room for the execution of this manoeuvre. The court is of the opinion that had the pilot, on seeing the bright light, at once stopped the engines and reversed, if necessary, the casualty would have been avoided. The court, therefore, suspends the license of Adjutor Lachance from this date until the completion of the season of navigation of 1913.

"The court exonerates the master and officers in charge from all blame."

THE NEW ALLAN LINERS.

THE new Allan liner Alsatian was expected to make her maiden trip to Quebec this month, to be followed soon after by her sister ship the Calgarian, and enquiries as to the probable date of her arrival have been frequent of late. Officers of incoming Allan line steamers have recently reported from information received on the other side, that the new liners would not be seen on the St. Lawrence this season, as their completion has taken longer than was originally expected.

Enquiries made at the local offices of the line have not elicited much information, but there are good grounds for the assertion that the Alsatian and Calgarian will not arrive at Quebec this year. One or both of the ships may possibly visit Canadian waters during the coming winter, however, if they can be completed in time.

It is the custom of the Allan line to undertake a sailing for the C.P.R. during the winter, and, after the close of the St. Lawrence season, it is the intention of the C.P.R. steamship management to give both the Empress of Ireland and the Empress of Britain a more thorough overhauling than either ship has had since they were launched. In that case, the Allan line will be looked to for two relief sailings.

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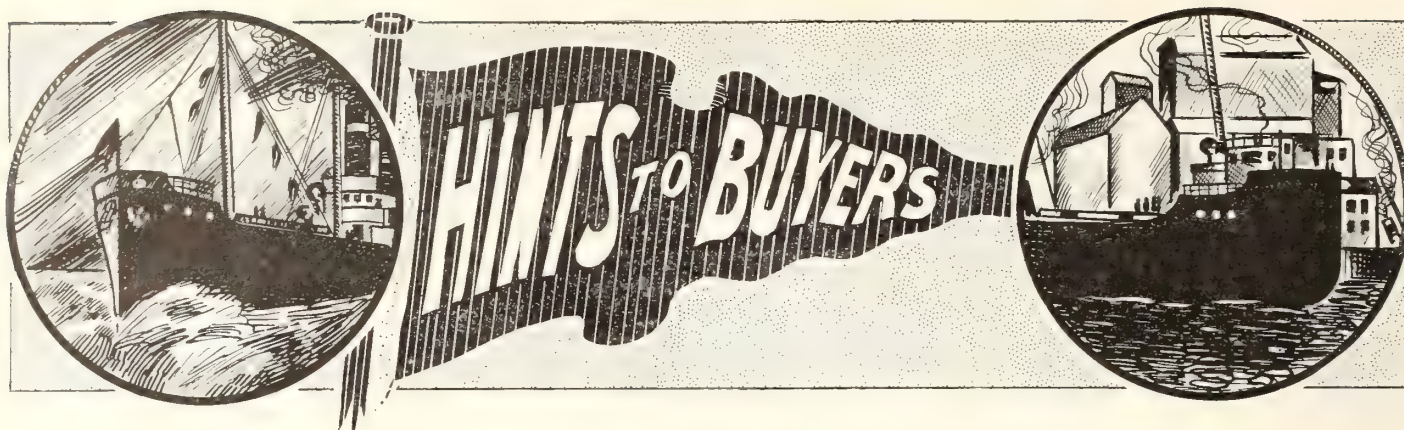
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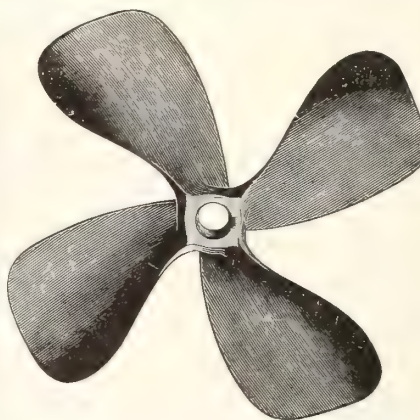
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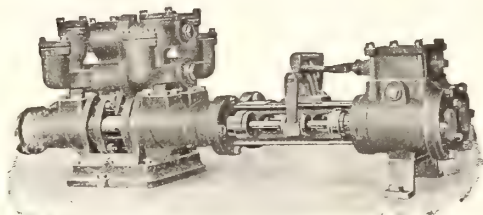
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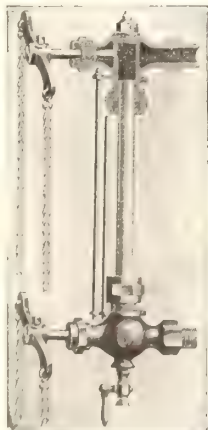
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The Ohio Brass Co., Mansfield, O.

**EIGHTH PAGE
SPACE**

The advertiser would like to know where you saw his advertisement—tell him.

CANVAS WORK

Hatch and Boat Covers
Yacht and Vessel Awnings

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Life Jackets, Ring Buoys,
Sails, Flags

MARINE HARDWARE

JOHN LECKIE LIMITED

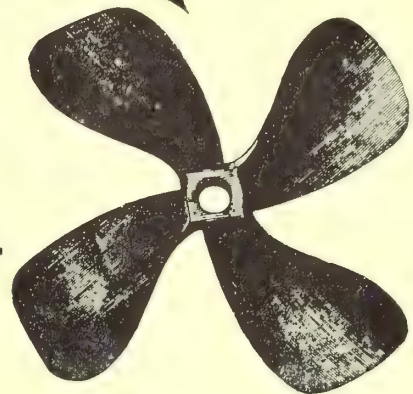
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MANGANESE BRONZE

PROPELLER WHEELS

Tensile
Strength
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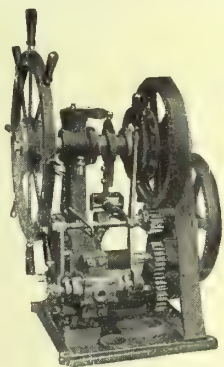


Write to-day for our descriptive booklet.

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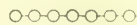
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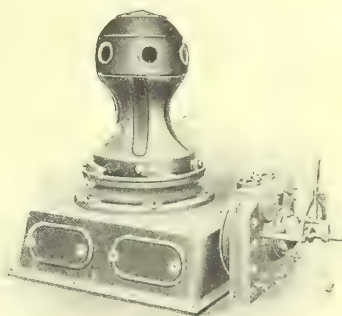


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Steam Steerers for Tugs
and Steamers. Single or
double wheel.



Steam Deck Capstans
direct connected to
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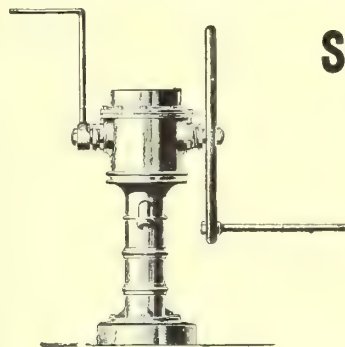
**Dake
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Grand
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Ship and Yacht

Fittings of Every
Description

Pumps, Portlights,
Sanitary Appliances,
Folding Lavatories,
Baths, Ventilators,
Bells, Hinges, etc.,
Send for Catalogue.



AGENTS WANTED IN CANADA



J. DOWNTON & CO.

69-71 West India Dock Road
LONDON, ENG.

Cables: "John Downton, Phone London."

Collingwood Shipbuilding Co., Limited

Collingwood, Ont., Canada



Canadian Government Steamer "ESTEVAN"—212' -200' x 38' x 17' -6.

Built by Collingwood Shipbuilding Co., Ltd.

**Steel and Wooden Ships, Engines, Boilers,
Castings and Forgings**

PLANT FITTED WITH MODERN APPLIANCES FOR QUICK WORK

**Dry Docks and Shops Equipped to Operate
Day or Night on Repairs**

CIRCULATES IN EVERY PROVINCE OF CANADA AND ABROAD

MARINE ENGINEERING of Canada

A monthly journal dealing with the progress and development of Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks, and containing a record of the latest and best practice throughout the Sea-going World. Published by

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MONTREAL, Eastern Townships Bank Bldg.

TORONTO 143-149 University Ave.

WINNIPEG, 34 Royal Bank Bldg.

LONDON, ENG., 88 Fleet St.

Vol. III.

Publication Office, Toronto—September, 1913

No. 9

POLSON IRON WORKS, LIMITED

TORONTO - - CANADA

**Steel Shipbuilders
Engineers and Boilermakers**



Steel Hydraulic Dredge "Port Nelson" built by The Polson Iron Works for the Department of Railways and Canals, to be used in the deepening of the Hudson's Bay Railway Terminal Port in Hudson's Bay.

Manufacturers of

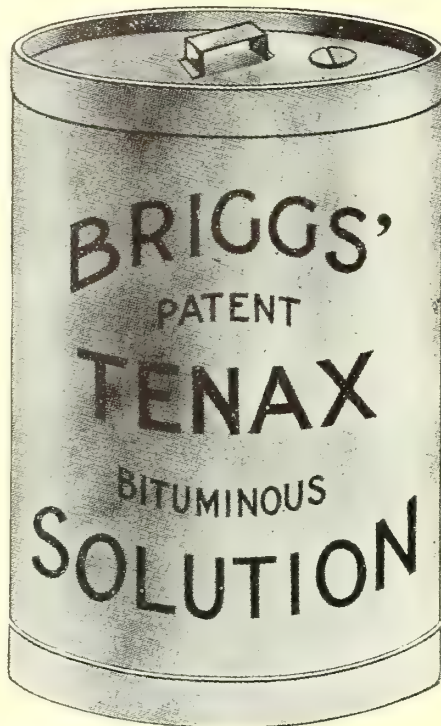
**Steel Vessels, Tugs, Barges, Dredges and Scows
Marine Engines and Boilers all sizes and kinds**

Works and Office : Esplanade Street East.

Piers Nos. 35, 36, 37 and 38

THE SOLUTION of the Corrosion Problem

The World's Record Anti-Corrosive.

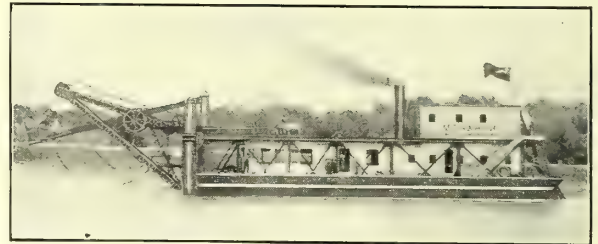


Specify and Insist on getting BRIGGS'.

WM. BRIGGS & SONS, Limited
DUNDEE & LONDON

Agents for Canada: MACDONALD & SONS,
176 King St. East, TORONTO.

Dipper Dredges Clam Dredges Steel Scows Drill Boats



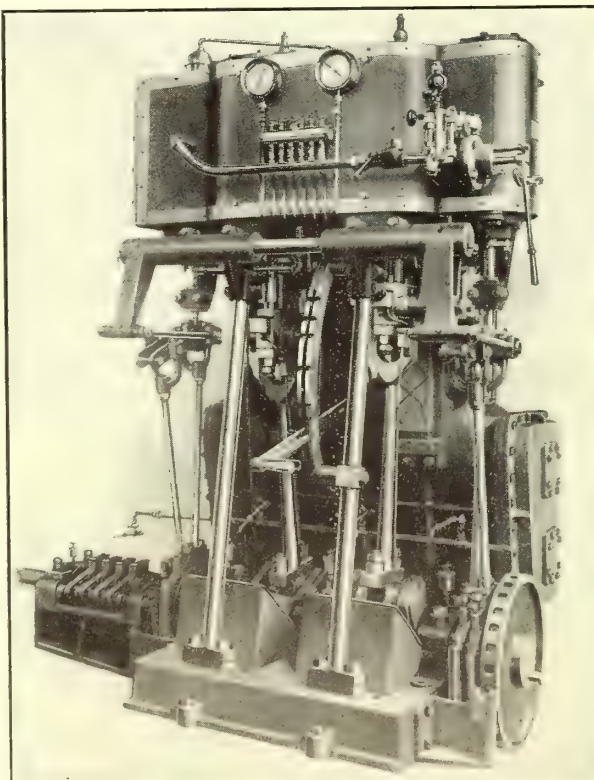
Equipment of this nature together with Hoisting Engines of all kinds are specialties with us.

Let us figure on your requirements.

We have the experience necessary to build anything you need in this line and you will find our prices right.

Send for descriptive matter now.

M. BEATTY & SONS, Limited
WELLAND ONTARIO



This is one of our Compound Surface Condensing Engines with Pumps and Horse Shoe Thrust attached.

The Doty Marine Engine & Boiler Co. LIMITED

Builders of High Grade

Marine Engines and Boilers

Compound Jet Condensing Engines
Compound Surface Condensing Engines
Triple Expansion Engines
Non-Condensing Stern Wheel Engines
Tandem Compound Stern Wheel Engines

Marine Boilers of various types including Scotch, Locomotive, Fitzgibbon, Fire-box Return Tubular and Safety Water Tube.

Estimates furnished for complete Marine outfits.

The Doty Marine Engine & Boiler Co.
LIMITED

GODERICH,

CANADA

The advertiser would like to know where you saw his advertisement—tell him.

Silent Influence

¶ Let us take a peach stone and drop it in the earth. We watch the soil with growing impatience for weeks and yet remain unrewarded with any appearance of life. We tire and forget.

¶ Nature, however, is infinitely patient, and in due time a sturdy tree blossoms and bears fruit on the spot where our hopes shrivelled up and died.

¶ It's the same way with advertising. There are some men who dig up their peach stone before it has had time to sprout. They fail to observe the silent growth, the hidden work and the subtle influence of the mighty force they have set in motion.

¶ They do not recognize the occasional inquiry as being simply the outward evidence of a potent work beneath the surface. It takes something more than a superficial examination to reveal the fact that the producing of inquiries is advertising's least important function.

¶ Let us be careful and unprejudiced in our analysis and we will discover and value at its true worth the real work that advertising performs—the standardizing of our name—the establishing of confidence in our product—the cementing of connection and the simplifying and minimizing of our salesmen's work. Then, instead of criticizing advertising we would do all we could to make its work more effective.

¶ An advertiser said to us a few months ago—"I simply haven't any time to devote to writing advertisements."

¶ "What takes up your time?" we asked.

¶ "Oh, correspondence and detail work," he said.

¶ "Listen," we said. "Correspondence is important, and detail necessary, but your advertising is more important and necessary than either. Unless your advertising is good it creates an unfavorable or negative impression, and you cannot afford that. If you make it good it will be the most effective agency you could possibly employ. It would pay you to take an hour or, if necessary, a day, once a month, to write your advertising."

¶ This advertiser took our advice, and is now reaping the benefit of it. Several good inquiries have been received, but this manufacturer emphatically states that it is the general effect of his advertising that has impressed him most. His salesmen all report favorably and state that the advertising is being read and referred to in their interviews with prospective customers.

¶ Take that old doubt and pessimism about advertising and file it to come up a year hence. Help your advertising along, study it, spend a little more time and money on it and at the end of a year when your old doubt and pessimism is laid on your desk you'll blush in shame and slam it in the waste basket.

Rate Card and full information gladly furnished

MARINE ENGINEERING of Canada

A monthly journal dealing with the progress and development of the Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks etc.

143 University Avenue TORONTO



Marine Engineers' Supplies

(In Brass and Iron)



**Boiler Accessories
Boiler Fittings
Deck Brass Work
Lavatories, Closets
Etc.**

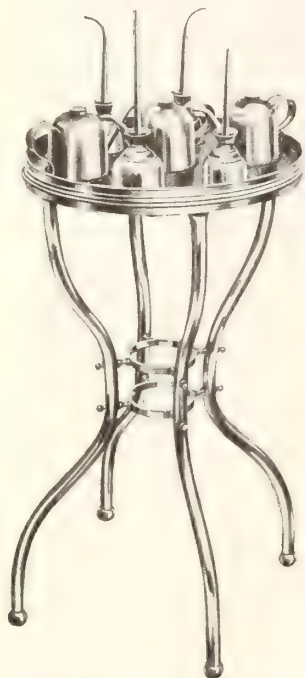
Highest Quality Guaranteed

Marine men should get familiar with our lines.

Our Marine Goods will meet your requirements in the best possible way and give every satisfaction.

Be sure to get in touch with us and get fully posted on their merits.

Your enquiries are solicited—We'll attend to them promptly.



Engineer's Oiler Set on Polished Brass Stand.



Steam and Oil Separator.



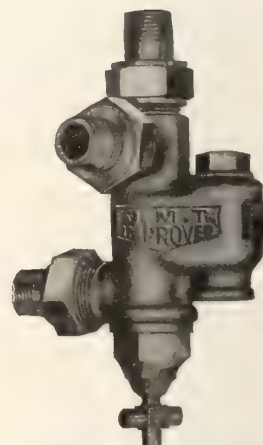
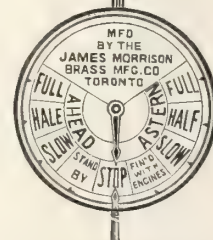
Marine Folding Lavatory.



Extra Heavy Bronze Y Blow-off Valve.



Ship Telegraph Apparatus.



J. M. T. INJECTOR
(Improved)

**The James Morrison
Brass Mfg. Co., Ltd.**

93-97 Adelaide St. West
TORONTO

The advertiser would like to know where you saw his advertisement—tell him.

C.P.R. Pacific Coast Service Steamship Princess Maquinna

If evidence were wanting that the Canadian shipbuilding industry can meet the demands and requirements which it may be called upon to fulfil with respect to the construction and equipment of steamships and other marine craft, made necessary by the rapid development of our Dominion and the transportation feature arising therefrom relative to lake, river and ocean coast, then this latest achievement by home builders, added to those chronicled in our columns on previous occasions, should be abundantly satisfying.

THE new steel single screw passenger and freight steamer "Princess Maquinna," built by the British Columbia Marine Railways Company, Limited, of Esquimalt, B.C., for the Canadian Pacific Railway Company's service to the West Coast of Vancouver Island, went into commission on the 20th of July, 1913, under command of Captain E. Gillen, who has served very successfully in the steamer "Tees" for many years past.

The design and plans for the vessel were prepared by the staff of the Canadian Pacific Railway Company's British Columbia coast steamship service in the office of Captain J. W. Troup, manager, and under his direction.

The Contract Award.

The contract for the vessel was let to the B. C. Marine Railways Company on October 24th, 1911, after tenders had been invited and received from several firms in the Old Country, and after due allowance was made for bringing the vessel out and renovating her after arrival, it was found that the offer of the local firm was the best, and the contract was duly awarded them, and much

credit is due the B. C. Marine Railways Company for undertaking and carrying to completion the building of such a vessel in this country, in competition with the Old World builders under such a handicap as they were subjected to.

It must be remembered that British-built vessels may come to and be registered in Canada in complete sea-going condition without the payment of duty of any kind, while Canadian shipbuilders may import their actual ship's plates, etc., free of duty, but they are obliged to pay duty on all machinery, boilers, pumps, outfit or equipment imported in connection with the construction of the vessel, and as many of these articles are standard, and are manufactured in free trade Scotland and England, and it being practically imperative that they should be fitted in all modern vessels, Canadian builders must, therefore, supply them and pay duty on these necessities, as well as on all other outfit and material purchased locally under a protective tariff.

Hull and Equipment Features.

The "Princess Maquinna" is built of steel, to Lloyd's 100-A1 class for an

awning deck vessel, and her principal dimensions are as follows:

Length between perpendiculars	232 ft. 6 in.
Length over all	250 ft.
Beam moulded	38 ft.
Depth moulded	17 ft.
Depth to main deck	17 ft.
Main deck to awning deck ..	8 ft.
Awning deck to boat deck ..	7 ft.

She has a straight stem and an elliptical stern, a flat keel and double bottom, sub-divided by watertight floors and a longitudinal water-tight, vertical keel plate fitted fore and aft for water ballast, make-up feed water and oil fuel. The double bottom extends from the fore peak to the after peak. There are six transverse bulkheads from the tank top to the main deck. The cargo hold forward is divided by a watertight bulkhead into two spaces.

The No. 1 hold is worked out of the fore hatch; the No. 2 hold through a trunked hatch overall. The after-hold is also worked through a trunked hatch overall.

Oil fuel tanks are built into the ship at the after end of No. 2 cargo hold,



C.P.R. PACIFIC COAST SERVICE STEAMSHIP "PRINCESS MAQUINNA."

and are divided by two fore and aft oil tight bulkheads, making three compartments for oil. The double bottom under the oil fuel tanks is also fitted for oil, and is divided longitudinally. Provision has been made for about 250 tons of oil, which should give the vessel a steaming radius quite sufficient for any of the coastal routes.

The "Princess Maquinna" is schooner rigged, with two pole masts of wood, and is fitted with the Marconi system of wireless telegraphy. Her cargo derricks are 45 feet long, with double winches at each hatch, all of which have cylinders 8 inches in diameter by 10 inches stroke, and the handling valves arranged so that one man can work both winches. They have helical gears, and were made by Andrews & Cameron, Kirkintilloch, Glasgow.

The orlop deck is of steel, and abaft the after-hold it forms a watertight flat. The awning deck is built to Lloyd's requirements as to stringers, beams, etc., and is covered with 3 x 4 edge grain decking. The boat deck is of the same construction.

There is a large side cargo port forward measuring 6 feet 6 inches by 9 feet in the clear.

Passenger and Crew Provision.

The dining saloon is on the main deck aft, and has seating capacity for 65 passengers.

The seamen and firemen are provided with accommodation in the usual fore-castle forward on the main deck, and the orlop deck forward has sleeping accommodation for 30 second-class passengers. The awning deck forming the fore-castle, from the deck house forward, a distance of 30 feet, is covered with checker plate steel, and special pains have been taken to keep the forward end of deck house free from openings, and thoroughly watertight.

On the awning deck there are 50 state rooms, and 4 on the main deck. Most of the rooms have 3 feet 6 inch lower berths, and 2 feet 6 inch uppers, with Hoskins spring beds. Reading berth lights, call bells, folding lavatories and the best of fittings are supplied to all state rooms throughout the ship.

There is a very handsome social hall, with large side ports near the after end of the enclosed steel deck house, and abaft this social hall there are 12 state rooms, 6 on each side, opening out on to a very roomy deck space.

On the boat deck forward is the pilot house, officers' quarters, with flying bridge over. From the mainmast aft is the smoking room, bar and wireless telegraph office. The smoking room is done in oak and upholstered in leather, with large windows and decorative skylight.

Eight seamless steel lifeboats are provided, and Canadian Government inspection requirements are attended to. The passages and social hall are handsomely panelled and finished in white, while the dining room is done in oak and mahogany.

The lavatories are in the centre of the ship, on both the awning and main decks, and the plumbing and ventilation are well carried out.

The galley and pantries are forward of the dining saloon on the main deck, and run from side to side of the ship.

Propelling Machinery.

The propelling power of the "Princess Maquinna" consists of a triple expansion engine, cylinders being, 20, 34, and 54 inches in diameter by 36 inch stroke. The valve gear is of the link motion type, the H.P. and I.P. valves being piston valves, with an L.P. slide valve. The pistons are all cast iron, strongly ribbed and fitted with Lockwood & Carlisle rings. The condenser is of the cylindrical type, of ample proportions, and the air pump is single acting, and worked by levers off the L.P. engine. The Weir pumps are in duplicate, each pump being able to supply the boilers at full power. A feed filter is provided, and a full quota of bilge pumps, sanitary pumps, auxiliary feed pumps, and ballast pumps have been installed.

The propeller is of the built up type, with cast iron hub, and Parson's Manganesse bronze blades. Ample arrangements have been made for lubrication throughout. The usual engine room telegraphs and counters have been fitted, and the ship is provided with Alfred Graham's loud speaking navy telephone between bridge and engine room. The ship is heated throughout by steam, and the electric lighting outfit is in duplicate. There are two boilers, of single ended cylindrical type, with three corrugated furnaces in each. They are 13 feet 6 inches in diameter and 12 feet long, and are designed for a working pressure of 180 pounds per square inch. They have passed Lloyd's tests, as well as the steamboat inspection service requirements. Dahl's system of burning fuel oil has been installed in an up-to-date manner.

Service Features.

The "Princess Maquinna" was designed for a 12-knot service speed at sea, and her performance indicates that the speed is easily maintained.

Her underwater lines are somewhat fine, although the beam is more than average for a seagoing vessel of this length.

Her loaded displacement, drawing 14 feet of water, fore and aft, is 1,860 tons, made up as follows:

Fuel	250 tons.
Fresh water.	44 "
Cargo	404 "
Ship's weight	1,162 "
<hr/>	
Total	1,860 tons.

Vessel Name.

The steamer is named after a Vancouver Island Indian Princess, the daughter of Chief Maquinna, of the Nootka tribe of Indians, and the idea of naming the steamer after this Princess occurred to Captain Troup whilst reading Captain George Vancouver's notes in connection with his visit to the West Coast of Vancouver Island.

It was on Tuesday, September 4th, 1792, that Captain Vancouver, accompanied by Signor Quadra, of the Spanish fleet, and a number of their officers proceeded to pay Maquinna a visit. The story in part is as follows:

"The weather, though cloudy, was very pleasant, and having a favorable breeze, we reached Tahsheis about two in the afternoon. Maquinna received us with much pleasure and approbation, and it was evident that his pride was not a little indulged by our showing him this attention. He conducted us through the village, where we appeared to be welcome guests, as a consequence perhaps of the presents that were distributed amongst the inhabitants, who all conducted themselves in a civil and orderly manner.

"After visiting most of the houses, we arrived at Maquinna's residence, which was one of the largest, though it was not entirely covered in. Here we found seated on some kind of form, Maquinna's daughter, who not long before had been publicly and with great ceremony proclaimed sole heiress to all his property, power and dominion. Near her were seated three of his wives and a numerous tribe of relations. The young princess was of low stature, very plump, with a round face and small features; her skin was clean, and, being nearly white, her person altogether, though without any pretensions to beauty could not be considered disagreeable. To her and to her father I made presents suitable to the occasion, which were received with the greatest approbation by themselves and the throng which assembled, as were also those I made to his wives, brothers and other relations. These ceremonies being ended, a most excellent dinner was served, which Signor Quadra had provided, at which we had the company of Maquinna and the princess, who was seated at the head of the table, and conducted herself with much propriety and decorum."

More Elevators a Requirement of All Canadian Ports

As has been aptly remarked in the daily press of Montreal, the voluminous, accurate and first hand information contained in the complete report on elevator and vessel requirements, of which the present reproduction is an abstract, cannot fail to prove of the utmost value, not only to the Montreal Harbor Commission itself, but in addition to shippers and grain dealers generally.

THE official report of Mr. W. G. Ross, chairman of the Board of Harbor Commissioners, which has been awaited with great interest by the grain and shipping interests of Canada, has come from the printers. The report is addressed to the Harbor Commissioners of Montreal, and makes a pamphlet of 42 pages, embodying fully the investigations undertaken by Mr. Ross in June last, when, accompanied by Mr. M. P. Fennell, jun., assistant secretary of the Harbor Commission, he proceeded as far as Port Arthur, for the purpose of securing such information as might best serve the Commission in its labors.

This involved first-hand information concerning "elevator capacities, elevator construction and equipment, elevator tariffs, freight rates on grain, and such other information as might be of service in the solution of the problems connected with the trade in Montreal."

Head of Lakes Facilities.

The report deals first with the terminal facilities of the Grand Trunk Pacific Railway at West Fort William, where, on two piers, provision is made for the erection of two elevator units with a storage capacity of 40,000,000 bushels, in addition to two miles of wharfage with three freight sheds, and a coal handling plant having a storage capacity of 300,000 tons.

There follows a detailed and technical

description of the first elevator unit, capacity 6,000,000 bushels which, says the report, is stated to be the most modern and best fitted elevator house at the head of the Great Lakes.

A visit was made to the office of the Grain Commissioner, where a conference



FARQUHAR ROBERTSON.
Montreal Harbor Commissioner.

was held with Dr. Robert Magill, Chief Commissioner, from whom much interesting information was procured.

Movement of Grain.

As to means of increasing the movement of grain through Canadian ports, with the present Lake marine and elevators, Dr. Magill stated that the cancellation of the Canadian grain certificates on all grain, once it crossed the boundary, for export via United States ports, might have for effect the desired result, but before recommending that such drastic action be taken, due consideration would have to be given to the effect of such cancellation upon the market.

Notwithstanding the fact that Canadian grain is shipped through the United States in bond, upon its arrival at destination, seeds not grown in Canada are found mixed with it, and yet it is sold to the European miller bearing the Canadian certificate. The cancellation of the certificate, as suggested, might mean that grain shipped via Canadian channels would command a higher price

in the European market, but such an action might be a hardship on the exporter, unless our facilities, etc., enabled him to reach that market with his grain. This question is now receiving the consideration of the Grain Commissioners.

What the Exporters Say.

Grain exporters with whom the subject was discussed stated that the reason the St. Lawrence route is not taking care of the entire grain traffic of the Canadian North-West is because of insufficient Canadian lake vessels; storage capacity at lake, bay and sea ports; ocean tonnage from Montreal.

The following table shows that the great leak in the main artery of Canadian transportation is not only still existent, but is increasing. In 1912, 44,519,182 bushels of wheat were not only shipped from Fort William and Port Arthur to American lake ports, but all of it, excepting 333,829 bushels, was transported in American vessels.

Year.	In Can. Vessels to Can. Lake Ports	In Can. Vessels to American Ports.	In American Vessels to American Ports.
1908	37,359,463	1,944,179	14,087,978
1909	37,296,735	3,315,646	15,972,860



W. G. ROSS.
Chairman Montreal Harbor Commission.



A. E. LABELLE,
Member Montreal Harbor Commission.

MARINE ENGINEERING OF CANADA

1910	38,271,487	1,844,153	16,640,800
1911	36,378,535	1,258,469	32,548,065
1912	53,217,861	333,829	44,185,353

These records show that, whereas the wheat shipments from these lake ports to Lower Canadian ports increased slightly over 40 per cent. during the last five years, the shipment to American ports have increased 180 per cent. during the same period, and whereas in 1908 Canadian vessels shared to the extent of one-seventh in the carrying of the American routed grain, in 1912 their share dropped to the one hundred and thirtieth part of it.

Last year, 44,519,182 bushels of wheat left these two ports routed through American channels, and the Canadian marine lost its transportation to the American lower ports, which rightly belongs to it, by its scarcity of vessels, a scarcity which a deep water channel to the sea would soon not only make adequate, but would divert to Montreal and other Canadian ports the greater portion of the grain trade which now seeks American ports.

Need of Westbound Trade.

Large wheat shipments to Buffalo last year were made, notwithstanding the fact that owing to the large grain crop in the United States, the port was from November continually congested, scores of steamers lying there waiting to be unloaded, a condition of affairs which compelled shipowners to charter for storage cargoes only, and which caused considerable grain to go via Canadian routes which would have gone to Buffalo, but for the delay in unloading there.

Just so long as a bushel of wheat is carried from Canadian lake ports to American lake ports in American vessels the lake shipping of Canada is inadequate, and until Canada has a westbound trade, capable of supporting and warranting the building of vessels on a par with American boats, she cannot control the carrying trade from the Canadian Upper Lake ports.

With the development of the package trade westbound on the lakes, Canadian vessel owners built steamers to control it, and these carriers have been a factor in making Montreal a large grain shipping port, which can carry grain cheaper than the craft that only get a one way cargo, and then only at the spasmodic movement of grain sent east which reaches its full volume in spring and fall seasons.

Until Canada furnishes a deep water channel to Montreal to tap her eastern coal fields, and supply heavy westbound freight, which is so essential to the development of the large carrying capacity lake steamers, equal in every respect to the large American craft, and capable

of coping with them in rates, Americans will control the bulk of the grain shipments.

Elevator Capacity Required.

Elevator storage capacity is the great and immediate need at every Canadian port on the grain route. The Government last fall endeavored to provide additional storage at Fort William and Port Arthur by suspending the Canadian coastal laws with the object of preventing grain being sent to Duluth and Minneapolis for storage, and also divert it from the American route to the seaboard by allowing American vessels to load storage grain for delivery to Canadian lake ports in the spring; a plan which, however, failed, for the majority of the 39 American vessels which took on grain during the winter delivered their cargoes at American lake ports.

Georgian Bay ports were also so congested last spring that vessel owners not only reluctantly chartered to these ports, but insisted upon the insertion of a special guarantee clause, or, in other words, the payment of demurrage charges, three to four days being the average demurrage during the months of May and June. Like congestion also occurred at Port Colborne and Kingston, as may be seen from the following telegram posted on the Winnipeg Grain Exchanges:

"Port Colborne, June 4.
"Standard Shipping Co.,
Winnipeg.

"Yours received. Expect have space for one—possibly two—small vessels this week. 'Montreal' badly congested. Steamers being delayed seriously there, which affects us. Prospects very bad until end of next week unless you can supply some tonnage. Met 'Nebling' and 'Hero.'

(Signed) "FAWCETT, Supt."

Seek Maximum Use of Ports.

The result of this and similar telegrams, continues the report, was an attempt to divert 600,000 bushels of grain to Buffalo, and the opinion is expressed that:

Whatever congestion there actually was at Montreal at the above date might have been removed before any of these vessels could possibly reach Port Colborne. At any rate, remarks like this should have been confined to Port Colborne, as they tend to divert grain to American channels.

At this stage of the report the conclusion is reached that in order to help our Canadian marine to handle our crops, it is imperative that additional elevator storage should be provided at once, so as to obtain during the short season of navigation the maximum results from our ports.

That the Commission proposes to act upon this conclusion is shown by its announcement of a new 3,000,000 bushel grain transfer elevator for the port of Montreal. The present plans call for the location of this elevator upon either Bickerdike or Yorke pier, Hochelaga, and upon its completion the elevator capacity of Montreal will stand at 12,760,000 bushels.

Capacity of All Elevators.

Below is the list of elevator capacities:—

Cities.	No. of Elevators.	Capacity (bushels).
Allouez, Wis.....	1	1,300,000
Boston, Mass.	3	2,500,000
Buffalo, N.Y.	18	20,180,000
Chicago, Ill.	65	45,360,000
Cincinnati	5	1,200,000
Cleveland	4	1,800,000
Collingwood	4	200,000
Depot Harbor	1	2,000,000
Detroit	4	2,850,000
Duluth-Superior ...	24	32,425,000
Erie, Pa.	1	1,000,000
Fort William-Port Arthur	24	41,035,000
Fairport, Ohio	1	1,000,000
Galveston	5	4,000,000
Gladstone, Mich. ..	1	450,000
Goderich, Ont.	2	1,800,000
Green Bay, Wis....	1	1,750,000
Halifax	1	500,000
Kenora-Keewatin, Ont.	4	1,740,000
Kingston	2	1,300,000
Manitowoc, Wis.	2	2,100,000
Meaford, Ont.	1	700,000
Midland, Ont.	1	1,200,000
Milwaukee	6	4,700,000
Minneapolis, Minn..	50	39,150,000
Montreal (1914) ...	7	9,760,000
New Orleans	6	4,700,000
Newport, News	2	2,750,000
New York	16	13,005,000
Omaha	12	6,575,000
Ogdensburg, N.Y. ..	2	590,000
Oswego	1	500,000
Peoria	3	2,250,000
Philadelphia	5	3,450,000
Point Edward	1	500,000
Port Colborne	2	1,900,000
Port Dalhousie	1	100,000
Port Huron	1	1,000,000
Portland	2	2,500,000
Port McNicoll	1	2,000,000
Prescott	1	1,000,000
St. Louis	36	10,020,000
Sandusky, Ohio ...	1	300,000
St. John, N.B.	1	500,000
Toledo	8	5,000,000
Tiffin, Ont.	2	3,400,000
West St. John, N.B.	1	1,000,000
Winnipeg	13	2,825,000

The voluminous, accurate, first hand information which the report of the Harbor Commissioner contains, cannot fail to prove of the utmost value, not

only to the Commission itself, but to shippers and grain dealers generally. Unstinted praise is due for the completeness and thoroughness with which the mass of material has been handled, and for the painstaking labor involved.



REGULATION OF OCEAN RATES.

FROM a laudable desire to benefit the Canadian producer and consumer, the Borden administration is considering the feasibility of regulating ocean rates through the Railway Board precisely as rail rates are regulated. Mr. Drayton has been investigating the subject in England, and is returning, it is said, with a mass of useful information.

Difficulties Great.

The difficulties in the way of superimposing ocean rates are, however, very grave. You may reduce the rates of a railway below a living profit and the road cannot help itself; it cannot move elsewhere taking its rails and its terminals with it, but if you were to make

there was a surplus of shipping everywhere, rates fell in many instances below cost of operation, and vessel property greatly depreciated. Then came the recovery of trade, and with it the establishment of what are called conferences between the regular steamship lines sailing to and from the same ports, whereby minimum rates were fixed and arrangements made for the more economical transaction of business.

Combines Beneficial.

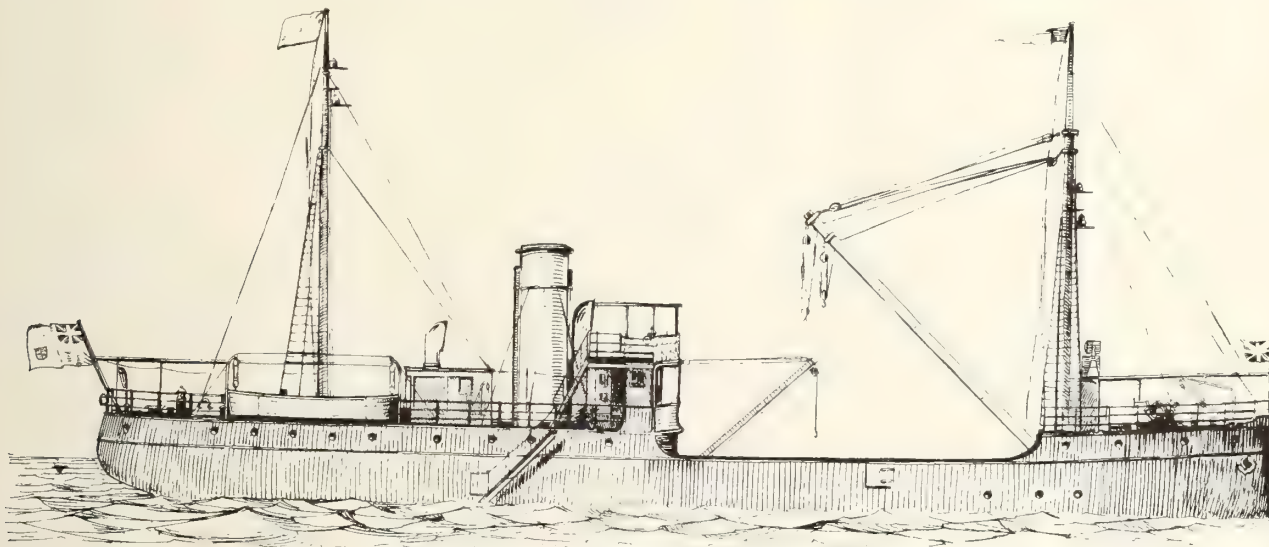
Though at first sight inimical to the public interest, this policy really served it, for if a fierce struggle for the survival of the fittest had ensued the result in the long run would have been the bankruptcy of the smaller and a victory for a few of the stronger lines, which thereupon would have been tolerably sure to form a close monopoly for the prevention of such wars in the future.

The conferences appear to have originated with the powerful German lines. In Germany, as everyone knows, the State tolerates and even encourages

Other lines, including the Canadian ones and those sailing to the United States, following this example, and, as a consequence rates have gone up from what they were in the period of profitless throat-cutting. No doubt, too, the increase that has taken place is due in good part to the advance in wages, coal and other supplies, not to mention the enhanced cost of construction. The real point, however, as the shipowners argue, is not whether rates are higher than they were, but whether, all things considered, they are reasonable in themselves.

An International Tribunal.

It may be taken for granted that Germany would not join us in forming an international tribunal for the regulation of ocean rates. Under existing methods her shipping has grown alike in tonnage and in the mammoth size of the vessels belonging to the principal lines. One or two companies are moderately subsidized by the State, and the steel employed in building ships is exempt from duty; but, speaking general-



NEW CANADIAN GOVERNMENT SINGLE SCREW BUOY STEAMER.

Length O.A., 164 ft. 6 in.; length B.P., 155 ft.; breadth moulded, 30 ft.; depth moulded, 13 ft.; mean draught, 9 ft. 6 ins.; classed 100 A1, Lloyds. Builders, the Polson Ironworks Co., Limited, Toronto.

it unprofitable for an ocean steamship line or for a tramp steamer to do business at a certain port, there would be nothing to hinder it from pulling up stakes and going to other points in the world where the conditions were more propitious.

Moreover, the task of regulating ocean rates would, it is obvious, have to be undertaken, not by us alone, but by all the other countries interested in our shipping, e.g., by England, the United States and Germany acting in conjunction with ourselves; and the question is whether they would help us in the matter.

Ocean Rate Increases.

It is not denied that ocean rates have risen of late. A few years ago when

kartels or combines among manufacturers, provided their prices to the home consumer are reasonable, on the ground that the members of the kartel are better able to pay standard wages when thus assured of a fair return on their investment, as well as to find more capital for the development of the industry, than if they were obliged to fight it out amongst themselves in a contest of each against all.

The same principle was introduced among the shipping lines. Uniform rates have taken the place of the old fluctuating ones and an economic distribution of tonnage is secured by a careful arrangement of sailing dates for each line in the conference so as to avoid duplication.

ly, the astonishing progress the Germans have made in recent years is attributable to the fact that capital invested in shipping can always reckon on a fair return in the shape of profits, and is therefore always prepared to back a new and help in the enlargement of an old line.

It is also doubtful if England would cooperate with us. In 1909 a Royal Commission investigated the shipping conferences and on the whole found no great fault with them. In England and other European countries the big lines exercise considerable power over shippers by granting or withholding what are known as deferred rebates—rebates consisting of a certain percentage of the rates which they receive if they remain

"loyal" to the conference by using its vessels exclusively, but which they forfeit if they patronize vessels not belonging to it. No such practice, it was shown, prevails in the North Atlantic trade either in Canada or the United States.

Nor is it at all likely that the United States would join us. An investigation into the conference system was held in the early part of this year by the House Committee on the Merchant Marine, which seemingly did its work well; and the evidence did not show that the American shipper or consignee had anything to complain of. The Sherman Act punishes combines in restraint of trade, but apparently it did not strike the committee that steamship conferences could be included in that category.

From the comments of American newspapers it is evident that our neighbors would not care to ask for Government regulation of ocean rates lest it might be carried too far and end in driving some of the weaker lines out of business and perhaps in discouraging the tramp steamers, which do a good deal to keep the rates low in the cotton and grain-shipping seasons.

Canada's Task.

It is manifest that if we in Canada were single-handed, to empower the Railway Board to reduce ocean rates, it could only apply on rates on outward-bound ships, ships sailing from ports within our jurisdiction; and, even here, the Board would probably run foul of the law of supply and demand and be floored by it. A superabundance of tonnage relatively to the quantity of freight offering means low rates, a scarcity of high rates; and we could not over ride that immutable rule by any sort of rational legislation.

On the other hand, taking into account the natural disadvantages under which the St. Lawrence route labors, the board would have to be extremely careful lest its action diverted the traffic to American ports, rendering our last condition worse than the first.

Altogether, it is a very large question, and one calling for the impartial judgment of the best minds in parliament. A Toronto paper says Mr. Borden should act at once because the high rates from Montreal have brought about a congestion of wheat in that port. This is a mistake. The congestion of wheat in Montreal is due to the circumstance that the wheat in the elevators destined for Liverpool is held at a higher price than the current market price there.

GRAIN STORAGE RATES UP.

THE promised jump in rates for grain storage in Montreal elevators is announced to take effect October first,

much to the satisfaction of inland speculators and grain handlers, who believe that, under the increased tax, the Harbor Commission will be able to maintain the elevators for transfer purposes, as they were originally intended.

The Cabinet Council of the Government has approved the resolution adopted by the Commission recommending an increase for storage after twenty days. The new rate will be three-tenths of a cent per bushel. At the Grand Trunk elevator, a similar rate will be enforced, and the free storage decreased from thirty days to twenty. The toll for elevating grain from lake or rail carriers is to undergo a like increase.

MOTOR VESSEL FOR HUDSON BAY.

ON August 27 an 80 ft. auxiliary ketch left Penzance, England, for a non-stop run to Hudson's Bay, a distance of 4,000 miles, and it is of interest that she is under the command of the same officer who navigated the "Linguette," a 30-ton barge with 30 h.p. Bolinders motor, from Weymouth to Pernambuco, which is 4,500 miles, in 34 days.

The "Fort William," which is 21 ft. 9 ins. beam, and has a loaded draught of 8 ft., is capable of carrying 80-100 tons of cargo. She is fitted with a two-cylinder 80 h.p. Bolinders engine, and in a trial trip made before the boat was sent away, a speed of about 8½ miles per hour was attained, under very unfavorable conditions. The engine will run on gasoleum, which is obtainable at her destination at 10 cents per gallon.

The boat will be put into service in Hudson's Bay on arrival, being due some time this month. Naturally, there is very little skilled labor available in the district, and the fact that hot-bulb engines are now being used so widely in the most inaccessible parts, says a good deal for their general reliability.

ELEVATOR CONTRACTS LET.

THE Barnett McQueen Co., Ltd., Winnipeg and Fort William, have been awarded the contracts for the internal storage elevators to be erected at Saskatoon and Fort William. Each of the elevators will cost almost one million dollars, and the Barnett McQueen Co. was the lowest of the four tenders received. They have just completed the erection of the Government terminal elevator at Port Arthur and the work has met with the approval of the Grain Commission.

Contracts call for the completion of the elevators by December 15, 1914, so as to be in time to assist in storing the

crop next year. As they each have a capacity of three and a half million bushels, this will greatly add to the storage capacity.

SOO CANALS TRAFFIC.

FOLLOWING is the statistical report of traffic passing through the canals at Sault Ste. Marie for the month of August:—

Eastbound.—Copper, short tons, 18,964; grain, bushels, 9,211,920; flour barrels, 1,437,364; iron ore, short tons, 7,461,384; pig iron, short tons, 2,414; lumber, million feet board measure, 105,166; wheat, bushels, 6,836,614; general merchandise, short tons, 57,958; passengers, number, 12,731.

Westbound.—Coal, hard, short tons, 383,847; coal, soft, short tons, 2,566,320; flour barrels, 400; manufactured iron, short tons, 37,193; iron ore, short tons, 9,136; salt barrels, 113,136; general merchandise, short tons, 212,770; passengers, number, 13,856.

Summary.—Vessel passages, number, 3,440; registered tonnage, net, 8,033,353; freight, eastbound, short tons, 8,263,273; freight, westbound, short tons, 3,226,169; total freight, short tons, 11,480,442.

Grain at Kingston.—So far this season, the Montreal Transportation Co's elevator at Kingston, Ont., has handled 7,248,010 bushels of grain, nearly two million bushels more than at the same time a year ago. The grain carrying trade has been very steady all summer. A busy fall is expected.

GRAIN STORAGE RATES.

VARIOUS opinions have been expressed by shipping men with regard to the announcement that the Government had approved a by-law adopted by the Montreal Harbor Commissioners, increasing the rates to be charged for storing grain in the elevators of the port, including not only the Harbor Commission elevators, but the Grand Trunk elevator also. Some were of opinion that the increased charges would tend to discourage the speculative holding of grain; others that the probable effect would be to divert still more Canadian and Western American grain by way of Buffalo, instead of Montreal, a view that has been expressed before now by more than one prominent port official.

A view of the grain trade in general which was expressed is to the effect that however beneficial the grain trade and its transit by way of Montreal and the St. Lawrence may be to Canada, it is not of much benefit to Montreal as a port. In this connection it was pointed

out that the handling of most kinds of merchandise exported results in about a dollar per ton being expended in the port, but that, in the case of grain, the benefit to the port is almost nil. Shipping men, however diverse the opinions they may hold, are all awaiting the result of the increased rates with considerable interest.



DECISION RE CORDOVA AND LADY OF GASPE COLLISION.

THE court is of the opinion that the cowardly conduct of Joseph Gauthier, the second officer of the Lady of Gaspe, in leaving his ship at the time of the accident, shows that he is not a fit and proper person to hold an officer's position, and the court, therefore, cancels his mate's certificate." In these words the Court of Wreck Commission,

Lady of Gaspe being navigated by a man who had signed on as wheelman, yet was acting as pilot, look-out, and in charge generally, who steered a course by buoys and range lights exclusively, and who lost his bearings directly fog and mist shut in the lights ahead, and who did not use the compass. The court severely censures the master, Cleophas Vezina, for want of supervision and not having a proper watch kept, and a look-out set, and properly organized boat-stations in case of accident; but, as he took prompt and proper action by setting his vessel on the bank, when he found her sinking, and thereby probably saved the lives of many of the passengers, the Court does not deal with his certificate."

Alone to Blame.

The Court found that the Lady of Gaspe was alone to blame for the collision, she having anchored in mid-chan-

brought into use for landing passengers from the Lady of Gaspe."

Other findings of the Court were that the two vessels were a mile apart at Three Rivers, that the Crown of Cordova attempted to pass the other vessel on the northward side, not knowing that the Lady of Gaspe had anchored, and that her engines were put full speed astern when the accident which took place was seen to be inevitable.



MARINE INSURANCE RATES.

THE Institute of London Underwriters has come to an important decision respecting the high insurance rates which are being charged for the St. Lawrence trade. According to H. S. Hanes, the Institute, in consideration of the extensive works undertaken by



C.P.R. STEAMSHIP "ST. GEORGE" LEAVING ST. JOHN, N.B., FOR DIGBY, N.S.
This vessel was recently purchased by the C.P.R. from the Great Western Railway Co. of England.

consisting of Captain Lindsay, Dominion Wreck Commissioner, and Captains Clift and Nash, dealt with the second officer of the Lady of Gaspe, which was damaged in collision with the Direct liner Crown of Cordova, off Cap Madeleine, on the night of July 28.

The evidence showed that Gauthier, together with several of the crew and passengers, was found after the accident on the forecastle of the Crown of Cordova, and the court held there was nothing to account for his presence there, except self-preservation.

Captain Censured.

"The Court severely criticizes the extraordinary lack of discipline on a vessel carrying over 130 passengers, the

nel, without regard to the fact that the Crown of Cordova was astern, and that apparently no attempt was made to see where the Direct liner was, nor were sound signals given, according to the rules of the road. The fact that the anchor was let go when the speed of the vessel was almost unchecked, and with a three-knot current astern, and that no effort was made to cant the vessel one way or the other with the helm, showed, the Court held, a total lack of seamanship.

Direct Liner Praised.

"The Court approves the conduct of the master, officers and crew of the Crown of Cordova, and the efficient manner in which the boats of the vessel were

the Canadian Government for the improvement and safer navigation of the river, has appointed special sub-committees to confer with Lloyds and the marine insurance companies.

Among the alterations to be submitted by the Institute are that vessels be allowed to trade to Halifax and St. John without an additional premium being charged; that the period of navigation for a fixed additional premium may be extended to 158 days or to the end of October, and that a smaller additional premium should be charged for vessels chartered for one voyage than is at present charged for cancelling the Baltic and British North American warranties.

LONGER NAVIGATION FOR SOO.

IN company with Hon. W. H. Hearst, Minister of Lands, Forests and Mines in the Ontario Government; Hon. Frank Cochrane, Minister of Railways and Canals in the Dominion Government, made an inspection of the waterfront at Sault St. Marie, and discussed local improvements with the City Council and members of the Board of Trade on Sept. 9.

Dr. Shannon, President of the Board of Trade, presided at a conference in the Council Chamber of the City Hall, and brought up the subject of an ice-breaker at the Soo, for the purpose of assisting in keeping navigation open for a longer period in the early part of the winter to facilitate the handling of the grain shipments from the West. It was pointed out also that if the lighthouse-keepers were not called in quite so early it would assist navigation. The Minister promised his support in the prolongation of the navigation season.

The influence of the Minister was solicited in preventing the narrowing of St. Mary River by means of docks being built out past the deep-water line, as it is contended that all the space available is needed at present for the large vessels plying up and down the river.

**NATIONAL PORT SOLUTION OF GRAIN WORRY.**

URGED by repeated congestion in the port during the summer, shipping and tradesmen alike are agitating the establishment of Montreal as a national port, with freedom from harbor tolls, and under the direct supervision of the Department of Marine and Fisheries.

Since the present government was established in 1911, the Board of Trade has not approached the Premier in regard to freeing the port, and the time is considered ripe for a strong petition to urge the Government to consider the claims advanced by the advocates of a free port. Since 1903, and for some time previous, repeated resolutions, petitions, and recommendations were made alike to the Government and to the Royal Commission on Transportation, without, however, any direct action being taken to lessen the tolls charged by the port authorities. It is thought that the situation has now come to a head, and it is feared by many that if the present system of administration, without reflecting in any way on the administrators, is allowed to continue indefinitely, irreparable injury may be done to the St. Lawrence as an ocean shipping channel.

Want Drastic Measures.

Much money, as has been pointed out by one fully conversant with actual and

past conditions in the harbor, has been expended by the various Governments on the canal system, as well as on the St. Lawrence channel itself. All this, it is now feared, may prove to be futile unless some drastic measures to effect the popularization of the port of Montreal as a shipping centre is undertaken. The most logical and healthy of such measures is generally felt to be the establishment of a free port. W. I. Gear, vice-president of the Robert Reford Co., agents for the Cunard, Donaldson, and Thompson lines, is a strong advocate of the system of free portage for vessels coming up the St. Lawrence route.

"The sooner we get a free port here the better it will be for the port and the country as well," said Mr. Gear recently.

The late Robert Reford, founder of the same firm, was also an ardent supporter of the move for a free port, which has been going on for some ten or eleven years. He was a member of the Royal Commission on Transportation which sat in Montreal in 1906-7, and which brought to the forcible attention, both of the Canadian and the British Governments, the advisability of acting at once before the business of the port should have swollen so large as to make a change impossible.

It was acknowledged through a statement published in the name of Major David Seath, secretary of the Harbor Commission, that the grain trade of the port had fallen off 5,000,000 bushels since 1898. The Commission met in secret conclave with grain and shipping men recently to consider means of alleviating a state of affairs in the transference of grain, which is admitted to be desperate. As was pointed out by the officials of the Commission, the storage capacity of the harbor has been steadily increased since 1900.

At Critical Stage.

Despite this fact, congestion still continues, and bids fair to reach a critical stage this fall, when the down-river rush of grain from the West sets in. Shippers aver that if the tolls were lifted from ocean vessels coming to the port, the inducement would be so great that there would be no difficulty whatever in disposing of the grain from the elevators once it arrived here.

Montreal would not be the only beneficiary from the establishment of a free port, according to the published statement of the Council of the Montreal Board of Trade. It was pointed out in the report of the Council that one-third of the entire export and import trade of Canada passed through the port of Montreal. The abolition of harbor dues would thus be a benefit to the large mass of both importers and exporters. Montreal was also the only port in Can-

ada which had constructed and maintained her own harbor without assistance from the Government other than loans, on which the interest was always paid.

The Board of Trade of Victoria, B.C., also passed resolutions advising the establishment of national or free ports. In 1906-7 the Royal Commission on Transportation strongly urged that the Corporation of the Harbor Commissioners of Montreal be taken over by the Dominion Government directly, and that the administration of the affairs of the port be put in charge of the Department of Marine and Fisheries.

Another aspect of the situation is also brought up in the recommendations made to the Governor-General in Council by the Board of Trade. Montreal could not hope alone to be allowed to do away with her harbor rates, and it is probable that a number of other ports would also be established as national ports. This would mean the benefit of cheaper transportation to the country at large instead of simply to one port. It is alleged by shipping and commercial men alike that the additional cost of administration which the Government would incur would be more than repaid by the hearty stimulus given to ocean trade, a stimulus which is generally recognized as a crying need in this port. Tramp steamers, it is said, are hard to secure, and British buyers do not want Canadian grain at the present time, much less since it is they who are finally forced to pay the harbor tolls which are imposed on the grain vessels sailing from Montreal."

**GOVERNMENT CONTRACTS AWARDED.**

A NUMBER of contracts were awarded at the meeting of the Dominion Cabinet on September 3, which was the most largely attended for some months.

The York Construction Co., of Toronto, was given the final contract on the Trent Valley Canal. This is the Seven River section, and the contract price is \$130,273.

Other new contracts are:

The Northern Dredging Co., dredging at Cheticamp, N.S., \$15,000.

The Standard Construction Co., wharf at Hautsport, N.S., \$18,685.

Quinlan & Robertson, Montreal, rebuilding head of the Grand Pier Canal, \$24,283.

The Hamilton Bridge Co., steel bridge over the Chambly Canal, Larocques crossing, \$2,450.

The Hamilton Bridge Co., double track railway swing bridge over the Welland Canal, \$65,800.

A. G. Marshall, Ottawa, installation of underground services in the House of Commons, \$11,995.



"EMPRESS OF ASIA" AT VICTORIA, B.C.

THE Empress of Asia, the second new addition to the C.P.R. fleet of Pacific steamers, arrived at Victoria on the evening of August 30, and was greeted by a large crowd of spectators, who crowded the wharf and cheered the vessel as she hove to. This is the termination of one of the most unique voyages around the world by the C.P.R., inasmuch as the Empress was the only Canadian vessel which has ever called at South African ports and collected quite a large number of passengers, who were eager to take advantage of the unique trip around the world by the Canadian Pacific Railway Co., which also afforded them an opportunity of studying the conditions in Canada on their way across the country from Vancouver.

The people of South Africa were delighted when the C.P.R. first mooted the idea of making the around the world trip by Cape Town, and great preparations were made for entertaining the passengers on their arrival at the several ports of call. The new Empress of Asia is the sister vessel of the Empress of Russia, which received a big reception on its arrival at Victoria and Vancouver recently, and which is now endeavoring to break her own records between Vancouver and China. Included in the passenger list were many Canadians and Americans.

Two Notable Vessels.

The most notable merchant steamers built in the United Kingdom during the past year were the two which the Fairfield Shipbuilding Co. constructed for the C.P.R. service, which received the titles of the Empress of Russia and the

Empress of Asia. Though outwardly the vessels are identical in appearance, there is a difference in the interior, the Empress of Russia being decorated in the French style, mainly Louis Quinze and Louis Seize, while the Empress of Asia is representative of the English style of the Georgian period. The leading dimensions are: Length, 590 feet; breadth, 68 feet, and depth, 46 feet, the gross tonnage being in the neighborhood of 15,000 tons.

A feature which catches the eye of the man who has but a casual acquaintance with ships is the cruiser stern. This gives a distinctly naval touch besides conveying the idea that a fast turn of speed can be attained. In point of fact the speed of the vessel is eighteen knots an hour. Accommodation has been provided for 1,100 passengers in all—200 first, 100 second and 800 third, and as



C. P. R. PACIFIC LINER, "EMPRESS OF RUSSIA," IN YOKOHAMA HARBOR.

the officers and crew numbered 470, the total complement is 1,570.

Elaborate precautions have been taken to secure the safety of all, and should any accident occur there will be little chance of the ship sinking, the vessel being provided with double the number of water tight compartments called for by the British Board of Trade.

In addition to size and speed the new Empress has a number of very attractive and novel features. The main saloon is 74 feet long and 64 feet wide, lit from the sides by a number of beautifully designed windows nearly five feet wide, and from above by a large well 26 feet by 16 feet wide. The tables are arranged to suit the demands of various passengers from small tables for two and four persons to semi-private tables for six persons set in alcoves, and larger tables for larger parties.

The first-class state-rooms on the bridge deck are enclosed in a complete steel deck house, 340 feet long. Each of these rooms measures 10 by 9 feet, with sleeping berths for two persons and a sofa so arranged as to be converted easily into a bed if required. The sleeping berths are so designed that should one passenger only occupy the room, the upper berth can be closed up, leaving only a single brass bedstead. Several of the staterooms are fitted with a dressing room, supplied with hot and cold water.

Surrounding the deck-house is one of the first-class promenades, 430 feet long, with a minimum width of eight feet. At the aft end for 100 feet, this promenade extends clear across the ship, and at the forward end it is enclosed by a screen, having large observation windows so as to give a sheltered promenade of 240 feet. A number of single as well as double berth rooms are provided for those passengers who desire absolute privacy, and there are also a number of suites consisting of bedroom, sitting room and bath-room. These appointments are all worked out in the English style of the Georgian period, and are extremely attractive.

There is also a well-equipped gymnasium and up-to-date laundry, while the kitchen and serving rooms are all that can be desired. The vessel is fitted with powerful engines and a long range Marconi system of telegraphing in addition to semaphore signalling from the bridge.

GRAIN VIA VANCOUVER.

IT is claimed that Vancouver will be an important grain-shipping port after the opening of the Panama Canal, when reduced water rates are available. Canadian grain shipments at the present time via the Great Lakes are hampered by the short season.

While heretofore it has been necessary to ship over the Eastern route, with the completion of the new roads to the West, and the opening of the Panama Canal, it will be necessary that exceptionally low rates be offered the shippers of the Western Provinces, such as Alberta and Saskatchewan, in order to induce them to ship via the Eastern route. It is claimed by some that grain shipments through the Panama Canal from this point are impractical on account of the liability of the grain to sweat owing to the heat to be encountered on this route.

The advantage of the Western route becomes more apparent when it is taken into consideration that the Panama route from Vancouver to Liverpool will be cut to 8,800 miles, as against 14,000 miles by way of the Straits of Magellan, and more than 16,000 miles by way of the Suez route. In fact, the time will be practically cut in half. It has been estimated that the entire crop of grain of British Columbia and Alberta and one-third of the crop of Saskatchewan will be exported by way of Vancouver, either in the shape of grain or in manufactured form. The production of this area for 1912 amounted to approximately 179,330,836 bushels, and this production will be increased upon the opening up of new parts of Canada by the completion of the Transcontinental railroads now under construction.

THE ARCH PRINCIPLE OF SHIP CONSTRUCTION.

FURNESS, WITHY & CO., of West Hartlepool have just placed orders for two cargo ships to be built on the Arch principle of construction under the Ayre-Ballard patent, and each of a dead weight carrying capacity of about 3,400 tons. One of them will be built by the North of Ireland Shipbuilding Co., at Londonderry, Ireland, and the other by Osbourne, Graham & Co., at Hylton, near Sunderland. The builders take a license from Swan, Hunter & Wigham Richardson, Ltd., and Mr. Maxwell Ballard, of Wallsend, who are the joint proprietors of the patent, and Mr. Ballard is supplying the designs.

It is a matter of considerable interest to shipowners to know that, although the Arch principle of ship construction is of comparatively recent date, yet during this year alone, three vessels of this type have been taken in hand at various shipyards. One was delivered to Canadian owners a few months ago; a second similar ship is under construction by the North of Ireland Shipbuilding Co., at Londonderry, and the third for the Donald Steamship Co., of New York, is now receiving her finishing touches at the yard of Osbourne, Graham & Co.

This is striking evidence of the in-

creasing popularity of the Arch principle of ship construction, showing that shipowners do really appreciate the economy to be effected by using this type of ship. The principle advantages of building on the Arch principle are briefly a large reduction in first cost, cargo holds free of pillars and other obstructions, and increased carrying capacity combined with very low net tonnage. Other special points of a more technical nature might be noted, namely increased strength, better stability, greater freeboard, an unusually high deck platform, and no so-called "wells" either forward or aft of the bridge amidships for seas to fill.

EXPRESS SERVICE SCHEME.

THE scheme for establishing an express service between Great Britain and Australia, via Canada, would seem to be making rapid progress, for the contract for the construction of two 25-knot steamers has already been awarded. Work upon a railway between Blacksod Bay, Mayo, and Collooney Junction, Sligo, which will have the effect of linking up the Irish railway system, will be commenced this month, while, on this side, a harbor is ultimately to be built at Cape Charles, on the southeast coast of Labrador, which will become the terminus of a new transcontinental railway line.

At first, however, vessels will run from Blacksod Bay to Montreal in summer and to Halifax in winter. There is, further, to be a connecting service between Vancouver or Prince Rupert, Fiji, Auckland, N.Z., and Sydney, N.S.W., so that it will be possible to reach the latter port within three weeks of leaving London, as soon as the new express service is in working order.

SHIPBUILDING PLANT FOR NORTH SHORE.

THE new dry dock to be built by the Federal Government will be built at North Vancouver on Burrard Inlet. The outlay will amount to \$4,000,000, and will cover the cost of constructing the largest shipbuilding dry dock and ship repairing works in Canada.

The plant will cover 80 acres, and when in full operation will give employment to over 2,000 men. The basin will give a depth of 30 feet at low tide, and the floating dock will have a lifting capacity of 20,000 tons. The plant will take three years to complete. The contract is in the hands of the Amalgamated Engineering Co., of which Sir Henry Pellatt, Sir J. M. Gibson and D. B. Hanna, all of Toronto, are directors.

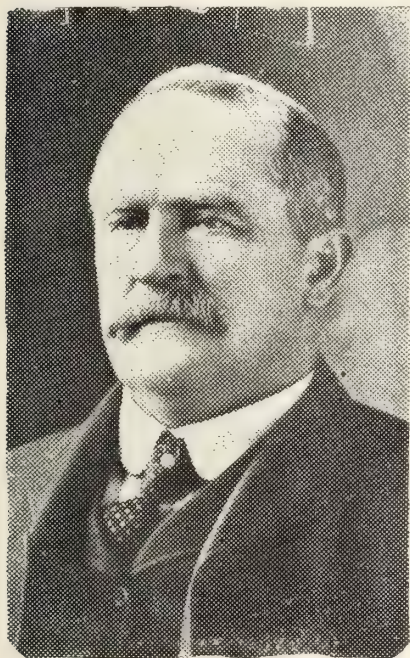
Notable Personalities of Canada's Merchant Marine

The Part That Shipbuilding, Marine Engineering and Shipping Companies Have Played in Bringing Canada Prominently Before the Eyes of the Civilized World, Has Not, We Believe, Received That Credit of Performance Which is Its Due. We Hope in This Series Dealing With "Notable Personalities of Canada's Merchant Marine," to Show That Those Who Have Bridged The Trackless Ocean to our Shores, and Provided the Facilities for Our Disembarkation, Are Worthy of at Least a Sentimental Regard.

THE LATE CAPTAIN REID.

CAPT. JAMES REID, of Sarnia, the veteran wrecking master of the Great Lakes, President of the Reid Wrecking Co. of Sarnia, died in Dearborn Retreat, Detroit, September 2, following a third stroke of paralysis. He had been only semi-conscious for weeks. His body was taken home to Sarnia the following afternoon on one of his own tugs, the Sarnia City.

The name of Capt. Reid is associated with some of the most famous wrecking feats on the Great Lakes. He was known from end to end of the latter. Born in Montreal 68 years ago, he went with his family to Alpena, Mich., where



THE LATE CAPTAIN REID.

he entered the lumber business. Gradually he became owner of several vessels, and became a wrecking master. Eleven years ago he moved to Sarnia. He was the owner of the steamers Spokane, Sharples and Ketcham, and tugs Fisher, Sarnia City and James Reid. In addition he was interested in the Port Huron Drydock Co.

Stricken While at Work.

Capt. Reid was first stricken while working to raise the ill-fated car ferry Marquette and Bessemer, whose sinking in Lake Erie was one of the greatest lake tragedies of recent years. He re-

covered, but was again seized while directing operations upon the wreck of the Richardson, off the Buffalo breakwater. His wife and eight children survive.

Some of His Achievements.

One of the Captain's greatest feats was raising the Philip D. Armour from 70 feet of water, at South-east Bend. The boat carried 100,000 bushels of grain. The Mataafa, Moreland and Steinbrenner, whose losses were among the heaviest in the lakes in recent years, were also raised by him.

Captain Reid had been a dominant figure in the history of the Great Lakes for the past 40 years, and his name had been synonymous with courage and enterprise wherever sailors have been gathered together. Perhaps no deed in the annals of the Great Lakes stands out more prominently than his, when pitting his bulldog tenacity and experience against the strength of frozen Lake Superior, he wrested more than half of the wrecked steamer Moreland from the rocks four years ago.



JOHN BELLAMY MILLER.

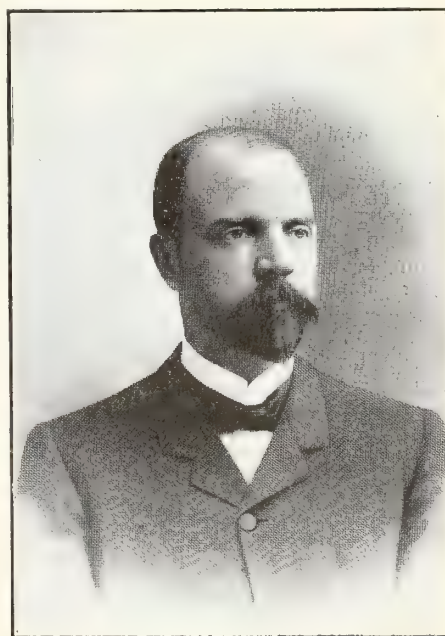
THE subject of this biographical sketch, John Bellamy Miller, was born July 26th, 1862, at Farmersville, (now Athens), Leeds County, Ontario. His father was John Clausin Miller, a member of the Provincial Parliament, and Lumberman of Parry Sound, Ontario. Up to the time of his death, in 1884, he was president of the Parry Sound Lumber Company. He was of German descent, his ancestors coming to this country with the Hessians during the Revolutionary War, so that for the past five generations the family has been of Canadian birth. Mr. Miller's mother, Adelaide Augusta Chamberlain, is of English ancestry, her forbears coming to America about the period of the Mayflower. Mr. Miller received his education at the Toronto Model School and in the Upper Canada College.

Following his educational training, Mr. Miller entered the lumber business with the Parry Sound Lumber Co. as clerk, and while holding this position mastered every detail of lumber manufacturing. In 1883, following his father's death, John B. Miller took com-

plete charge of the business, and was made president of the company, which position he still holds. He is also president of the Polson Iron Works, Limited, of Toronto, and holds a like position in the Polson Dry Dock and Shipbuilding Co. of Toronto.

Added to the above, Mr. Miller is president of the Parry Sound Transportation Co., president of the Consumers Box Co., of Toronto, and director in Plastics, Limited, of Toronto; also was largely instrumental in the formation of the Canadian Lumberman's Association, of which he is president.

However vigorous and trying his duties, they do not prevent Mr. Miller



J. B. MILLER,
President, The Polson Ironworks, Ltd.,
Toronto.

from club recreation, for he holds membership in the following clubs:—The National, the Royal Canadian Yacht, the Ontario and the Rosedale Golf Club of Toronto; Granite Curling Club, also the Rideau and Laurentian Clubs of Ottawa.

Mr. Miller was married October 3rd, 1883, to Hannah Pollock Hunter. Mrs. Miller died in 1893. By this marriage there were two sons, John Clausin Miller and Henry H. Miller. Mr. Miller's second marriage occurred September 22, 1897, to Jessie Thompson, of Longford, Ontario, a daughter of John Thompson, a prominent lumberman of that place. One daughter survives this union.

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PETER BAIN, M.E., Toronto - Editor

OFFICES:

CANADA—

Montreal—Rooms 701-702 Eastern Townships Bank Building.
Telephone Main 1255.

Toronto—143-149 University Ave. Telephone Main 7324.

Winnipeg—34 Royal Bank Building. Phone Garry 2313.

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New York—R. B. Huestis, 115 Broadway, New York.

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THE BROADSIDE LAUNCHING FEATURE.

THE practice of launching vessels broadside-on in our inland waters has given occasion for many queries reaching us as to the reason for same, and in this latter connection it may be stated that a large percentage of the inquiries emanate from natives of the Old Land now resident in the Dominion, and whose observation and experience in many cases has accustomed them to stern-on launching.

It will be easily appreciable on the part of those indicated, that shipbuilding in Great Britain finds its location

on the banks of tidal waters, and it will be equally apprehended that the like industry in Canada, finds for the most part its location on our Great Lakes where tides are not in evidence. The tidal and non-tidal feature relative to shipyard location constitutes therefore, the variation in method adopted. A narrow river, with outlet to tidal water and subject to the influence of the latter, would, of course, be sufficient reason for the same system application as for the non-tidal water; there being possibly insufficient sea room, as we may term it, to take care of a vessel launched stern-on.

To launch a vessel after the latter fashion, the fixed ways, on which the launching cradles or moveable ways slide, have to be run out into the stream or such body of water as is available, for a considerable distance, in order that the vessel have, for certain, a sufficient depth of water to take care of the dip aft, until the forward end shall have become afloat, and, therefore, beyond the necessity of further dependence on the ways for guidance and support. In order then to get the fixed ways laid the necessary distance beyond the vessel stern before launching, the tidal aid is requisitioned. At low water, and for such period on either side of this feature as can be secured, the fixed ways are placed and built-up, a proceeding only possible, as will be gleaned, by taking advantage of conditions made available by the rise and fall of the tide.

On our inland lakes and rivers, tides are not at our service, hence the impossibility, although perhaps not the impracticability of laying ways for launching vessels stern-on. We refer to the non-impracticability aspect, simply because, with the aid of divers, the job of laying fixed ways might be satisfactorily performed, but the question of cost and time, not to speak of the risks run through improper workmanship, make the diver proposition altogether prohibitive, and highly uncomplimentary to 20th Century achievement.

In the broadside method of launching, a series of fixed ways become necessary because of the fact that provision has to be made to carry the whole vessel in a direction at right angles to her length, whereas the stern-on method requires but one way or track on each side of the vessel, running fore and aft. In the former case the cross-ways as they may be called, extend from a short distance on the inner or shore side of the vessel to the edge of the dock or basin into which she drops as the cradles leave the ways, and she becomes water-borne.

The stern-on launch is by far the more graceful, and appeals to the onlooker, as being more in conformity with the general fitness of things, yet natural conditions with respect to tides are presently insurmountable and likely to remain so, therefore, to those conditions we must adapt ourselves, and who, having had the privilege of studying the preparations made for the launching of mammoth lake freighters in our inland shipyards, will not unstintingly give credit, for the display of skill and intelligence, to those of the honored craft of naval architecture and shipbuilding, who so successfully offset the natural disadvantages to stern-on launching, by the efficient substitution of its broad-side feature.



A MAN'S value to his employer is not in his large bones and muscles, his weight lifting and strenuous physical labor. Human muscle power is the most expensive form of energy used. A man is valuable in proportion to the thought, the physical inspiration, and the happiness he puts into his work. A man, doing work that he does not love, lacks enthusiasm, interest, and concentration, therefore, is not efficient.—The Leviathan.

MARINE NEWS FROM EVERY SOURCE

Sarnia, Ont.—Extensive repairs are being made to the Northern Navigation freight sheds at Point Edward.

Quebec, Que.—The Harbour Commissioners' yacht Gossoon, a new craft 30 ft. long, was burned recently, and will be replaced.

Toronto, Ont.—Fire broke out in the Toronto Ferry Company's offices at the foot of Bay Street Sept. 13. The damage amounted to \$2,000.

The Gaspé Steam Ship Co., incorporated at Quebec to construct, own, etc., tugs, barges, etc., at Quebec, P.Q., with \$100,000 capital. Incorporators: Edouard Bouchard, Francois Bouchard, etc., Quebec.

St. John's, Nfld.—The Terra Nova, made famous in connection with the ill-fated Scott expedition to the South Pole, returned Sept. 3, having been repurchased by Bowring Bros. to become once more a sealer.

Toronto, Ont.—V. T. Bartram, dredging contractor of Toronto, lost a dredge worth \$25,000 in the St. Lawrence River recently. He also lost two scows worth \$8,000 each. His loss is only partly covered by insurance.

Sault Ste. Marie.—The Sault Dredging and Construction Co. of this city have been awarded the \$90,000 contract for dredging the channel between Goat Island and Little Current on Manitoulin Island, to a depth of 22 feet.

Quebec, Que.—The foremast of the steamer Manchester Importer gave way on September 13, as the derrick was lifting a sling of timber. The whole thing came down on the deck, killing a man named Halle, of Levis. Another ship laborer had his leg broken.

Lake Steamer Changes Hands.—The well-known lake steamer C. A. Jaques, owned by the Jaques Transportation Co. has been acquired by the R. & O. Navigation Co. The steamer is 2,105 tons gross, and 1,590 net, and was built at Dumbarton, Scotland, in 1909.

Sarnia, Ont.—A number of repairs are being made to the Northern Navigation freight sheds at Point Edward, with a view to the better handling of the

freight when the big rush starts in a few weeks. The company is enlarging the big doors and making other changes.

Montreal, Que.—Recently considerable headway has been made in connection with the plans of the interests behind the Canadian Transportation Lines, and final arrangements in connection with the transfer of some of the companies to be included will now be made within a short time.

Halifax, N.S.—The steamer Uranium from New York for Rotterdam arrived here Aug. 31 with her cargo afire. The cargo consisted of cotton, lumber and flour. The crew battened down the hatches and the Uranium came at full speed for this port, where the fire was extinguished.

C.P.R. Steamship Sale.—The steamship "Prince Rupert," for some years in the Bay of Fundy service, has just been sold by the Canadian Pacific Railway Co. to West Indies interests, and will be employed in those waters. The "Prince George" has taken the "Prince Rupert's" place.

Submarine Bell Buoy.—A submarine bell buoy is to be placed off Fame Point, about half a mile northward of the lighthouse. The buoy will be of iron, surmounted by a slatted superstructure, and having dependent from it a submarine bell, which will be rung at irregular intervals by the motion of the buoy on the waves.

Sault Ste. Marie, Ont.—The commercial portion of the city's waterfront is to be extended by the addition of a large dock and warehouse for the Standard Oil Company, the contract for which has been let to John Boyd, a local contractor. The dock will cost \$50,000, and the warehouses and equipment will involve the expenditure of over \$75,000.

Kingston, Ont.—The Department of Marine and Fisheries will erect a wireless telegraph station 300 feet northwest of Fort Henry for the purpose of forming a connecting link between Montreal on the east and Toronto on the west in a chain of stations reaching across Canada from Labrador to Vancouver. A site has been secured, and the work will be commenced shortly.

Quebec Steamship Co.—The story that the Quebec Steamship Co. was about to enter the Canadian Transport merger is confirmed by a statement from Mr. J. T. Ross, president of the Quebec Steamship Co., which operates a line running to Bermuda and the West Indies. Mr. Ross states that negotiations have been completed, and all that remains to be done is the turning over of the securities.

To Rebuild Imperator.—The Imperator, which is to be withdrawn from the New York service in October, will have to be partially rebuilt, it is claimed. Her boilers have proven deficient and the boiler room will be entirely reconstructed. She will also be equipped for oil fuel. The luxurious millionaire suites have been found unprofitable, and will be replaced by a larger number of small staterooms.

Transfer of Control.—The district between Lachine and the entrance to the Soulanges Canal in Lake St. Louis has, since the 1st of this month, been transferred from the control of the Prescott agency to that of the Montreal agency of the Marine and Fisheries Department, and will henceforth receive the same attention as any other section of the river under the control of the local agency.

New C.P.R. Liners.—At the annual meeting of the C.P.R., the shareholders will be asked to approve the purchase of two new intermediate steamers for the Atlantic trade. The new liners will each be 500 feet long, 64 feet beam, 11,600 tons gross tonnage, and will cost approximately \$1,500,000 each. These steamers are urgently required for second and third-class passengers, and for freight traffic between European ports and Canada.

For Snowy Weather.—The lighthouse board have had under consideration the installation of a black beacon on the face of certain lighthouses on the St. Lawrence, for use in the late fall only, when snow is on the ground. The object is to provide a distinguishing mark in snowy weather, which will have the effect of obviating mistakes in navigation which might otherwise occur in consequence of the banks of the river being covered with snow.

Sault Ste. Marie, Ont.—The commercial portion of the city's water front is to be extended by the addition of a large dock and warehouse for the Standard Oil Co., the contract for which has been let. The dock will cost \$50,000, and the warehouse and equipment will involve a further expenditure of over \$75,000. Provision will be made for docking the largest of the vessels of the Standard Oil Co.'s fleet, which convey the oil in bulk to Sault Ste. Marie.

New West Indies Liner.—There has been launched at South Shields, the steamer *Savan*, built to the order of Scrutton, Sons & Co., of London, for their Direct line service to the West Indies and Montreal. The new liner is 381 feet long, 50 feet 4 inches beam and 28 feet 2½ inches depth. She will be fitted with triple-expansion engines supplied with steam from two large steel boilers fitted with forced draught, and working at a pressure of 180 pounds.

"Imperator" Makes Record.—The *Imperator* sailed on September, 11, with the largest number of souls ever aboard a ship, a total of 5,019, including passengers and crew. There were 828 first cabin passengers, 683 second, 614 third and 1,344 steerage, making 3,619 passengers. The crew, which included nearly 200 extra stewards, numbered an even 1,400. The *Imperator's* record cannot be lowered until the new giant *Cunarder*, the *Aquitania*, is in commission.

Dominion Customs Revenues.—Customs revenue for the Dominion still shows a steady increase. The receipts for August were \$10,838,666, as against \$10,147,908 for the corresponding month last year. This shows an increase of \$690,757. For the five months of the present fiscal year, ended August 31st, customs revenue was \$49,737,999, compared with \$46,397,937 for the same period during the former fiscal year, an increase to date of \$3,340,062.

St. Catharines, Ont.—Notices have been sent out to the farmers residing along section No. 2 of the new Welland Ship Canal whose land has been expropriated by the Government, advising them that the land required by the canal authorities must be vacated by October 1 next. Tenders have not been called for this section of the work, but will be in a few days' time. The filing of notices to vacate is taken as an indication that work will commence very shortly on this part of the canal.

New Freight Sheds.—Plans have been filed in Ottawa for two new freight sheds, to be built by the Harbor Commissioners of Montreal, at a cost estimated at \$300,000. One shed

will be 275 feet in length by 106 feet wide; the other, 485 feet long and 112 feet wide. Both sheds will have two storeys. They will occupy sites on the new wharves at sections 24 and 25 respectively. The foundations will, if possible, be laid this fall, but the superstructures will not be erected before next season.

New Lakes' Steamer.—A second steamer for service on the Great Lakes has just been completed at Londonderry, Ireland. She has been named the *Glenfoyle*, and is a sister ship of the *Glenmavis*, which came out from Londonderry under her own steam earlier in the season. The *Glenfoyle* has been constructed on the Ayre-Ballard arch principle. Her leading dimensions are: Length, 250 feet; beam, 42 feet, 6 inches; depth, 26 feet. She has been built under special survey for the St. Lawrence and Great Lakes trade.

Donaldson Line Future.—The fact that the Donaldson Line are embarking in the River Plate trade, coupled with the recent flying visit paid to this port by W. C. Donaldson, head of the firm of Donaldson Bros., of Glasgow, has caused rumors to be circulated in shipping circles as to impending developments in other directions, in connection with the popular Scottish line. Local officials of the line, or of its agents, are reticent when questioned, but their guarded replies are scarcely calculated to convey the impression that the rumors referred to are ill-founded.

Unsinkable Mattresses.—A large Paris factory is busy filling an order for thousands of mattresses which are pronounced unsinkable. A vegetable substance which is light, supple, and soft enough for use as mattresses in berths aboard ship and at the same time unsinkable, was recently discovered. Every passenger on a ship furnished with these mattresses—if they are what is claimed for them—will have an ideal life preserver right in his bed. Several large steamship companies are said to have decided to replace their present bedding with these new mattresses.

Twin Ships Try Race.—An interesting test is being made of the comparative speeds of the two sister ships, the *Empress of Russia* and the *Empress of Asia*. Both were built at Fairfield on Clyde, and are absolute duplicates. The *Asia* was launched two months later than the *Russia* and went out to the Pacific by way of Cape of Good Hope, instead of via the Suez Canal, so there was no proper standard of speed comparison. It was, therefore arranged that both steamers should leave their terminal ports on the same day, September 10th. The race is being watched with great interest.

Halifax, N.S.—How to provide accommodation for the greatly increased winter port business, was the question under consideration at a recent session of the Board of Trade. The dock accommodation is now a live issue with the port. The business of Halifax increased more last year than that of any port of Canada, and this year the port is to have three additional lines of steamers, one of which is going to run six boats a month. A suggestion was made that steps be taken towards having the pier, now under construction at the terminals, temporarily arranged to give two extra berths.

Aid to Navigation.—Engineers of the Lighthouse Bureau have finished installing the new apparatus at Whitefish Point and, since September, 5, mariners are being guided by one of the largest lights in the world. It has 3,000,000 candle power. The increased intensity was obtained by changing from oil to incandescent oil vapor. The new light is the largest on the Great Lakes. Up to this time the Split Rock and White Shoal lights have been the most powerful, 1,200,000 candle power. They can be seen 25 to 50 miles, but the new light can be seen 75 miles except during storms.

The New Allan Liners.—The new Allan liners *Alsation* and *Calgarian* will likely make Montreal on their first voyages to the St. Lawrence next. The depth of water in the ship channel will then be at the maximum, so it should be quite safe for the vessels, large though they be, to come up. The management of the Allan line consider that bringing the ships to Montreal at the commencement of the season is one of the best advertisements, and one likely to yield good results, during the remainder of the St. Lawrence navigation season. The news has not yet been officially given out, but is an open secret in Montreal marine circles.

Quebec's New Dock.—The dock which is in course of construction on the Quebec side of the river for the use of the proposed new railway car ferry, seems to be followed by ill-luck. The first foundation crib, on being sunk, capsized, and had to be lifted. The second suffered a similar fate. On the afternoon of September 6, the fifth crib was being brought out into position when it went adrift, dragging the tug with it, remaining out in the stream until another tug was brought to its assistance.

Dredge Name Change.—An Order-in-Council has been passed changing the name of the dredge "*Sir Wilfrid*" at Toronto to "*P. W. D. No. 117*." This is understood to be in the interests of navigation.

LAKE LINERS FOR C. N. R.

IN connection with the visit to Port Arthur of General Manager McLeod and other Canadian Northern Railway officials from the west, it is stated that the railway company may shortly negotiate with the Western Dry Dock and Ship Building Co. for the building of two passenger lake liners, both of which it is stated will be larger than the *Noronic*. It is well-known that the Canadian Northern will have to acquire a line of lake passenger steamers in order to compete with the Canadian Pacific and the G. T. P. The through C. N. Transcontinental Railroad will be in operation next year, and all that will be lacking to surround the Canadian Northern with the prestige enjoyed by its competitors will be a steamship line.

MONTREAL PORT REVENUE DECREASES.

FOR the first time during the present financial year Customs and Inland Revenue returns show a falling-off as compared with the month of August, 1912. The decrease in the Customs revenue amounts to \$49,193.73, the receipts having totalled \$2,269,678.57, as compared with \$2,318,872.30 for August, 1912. The decrease in Inland Revenue amounts to \$37,863.30, the receipts having been \$871,265.54 for August this year, as compared with \$909,128.84 for the corresponding month of last year.

Enquiries made at the Customs House and of officials of the Inland Revenue Department tend to show that too much importance may easily be attached to this temporary check, and that it would be premature to contend that there is any diminution of the prosperity of the port to be apprehended in the near future.

There was one working day less last August than in August, 1912. The decline in Inland Revenue has also been partly due to a falling off, apparently only of a temporary nature, in receipts from the importers of cigars.

PROTECTING THE TRAVELLER AT SEA.

CANADA will be represented at the International Conference to be held in London next November to inquire into measures for life-saving at sea. This conference, which will be the most important of its kind ever held, will see the final discussion on the rules which have been drawn up by the British Board of Trade, consequent upon the Titanic disaster.

The Canadian Government, acting through the Department of Marine and Fisheries, is co-operating with the Brit-

ish Board of Trade in drawing up advanced regulations for the protection of travellers at sea. It is asking the Canadian passenger lines for expressions of opinion as to what further measures ought to be adopted to safeguard the lives of passengers. These views will be placed before the Conference by the Department of Marine and Fisheries.

Since the Titanic disaster, the British Board of Trade has been considering means for increasing the safety of ocean travel. The result of the coming Conference will be the enforcement of these means. Canada will conform to the new regulations as far as her ocean shipping is concerned, and a representative will be sent by the United States and by each of the other great shipping nations of the world.

A list of questions has been submitted by the United States Marine Department to the different passenger steamship companies, and it is probable that these questions, which deal with the manning of lifeboats, the extension of standard tests, medical tests for lookouts, etc., will be made the basis of the interrogations which the Canadian Department of Marine will place before the Dominion lines. They cover generally the extent to which the whole of a ship's crew should be utilized in life-saving measures in the event of disaster. Similar questions with regard to crews of cargo steamers will be asked.

DISAPPROVAL OF IRON BUOYS.

SEVERAL Montreal pilots are expressing disapproval of the decision of the Marine and Fisheries Department to substitute iron buoys for those made of cedar. The reasons given by the department for the change are that iron buoys scarcely deteriorate at all from exposure to the severest weather, as was shown by the test of ten iron buoys which were allowed to remain in Lake St. Peter all last winter; also that they are not so liable to damage from passing steamers, especially side-wheelers, many spar buoys having, in the past, been cut in two by steamers of the latter class. It is also claimed that cigar-shaped iron buoys are more easily discernible than the cedar variety, which have to be furnished with balises on top to enable them to be distinguished from a vessel's decks.

Many pilots are arguing that, while spar buoys may be more easily destroyed by passing steamers, iron buoys will be more likely to inflict damage to any steamers which may strike them accidentally; in fact, apprehension is felt as to the probable effects on a propeller which comes into collision with an iron buoy.

The Marine Department may find a way out of the difficulty by proving to the pilots that the iron buoys, being more easily discernible from the deck of a passing steamer, no careful navigator should ever strike them; or that, in case of accident, the probable effects are not likely to be so bad as some of them imagine. The Marine Department had difficulty in convincing pilots of the utility of using red lights on the star-board side of the channel, coming up the river, but officials claim they have succeeded, and, should they be able to prove that the apprehensions with regard to iron buoys are ill-founded, they will thereby allay much anxiety which at present is being felt.

NEW GRAIN CROP SHIPMENT.

FOR the first time in many years the first crop of grain harvested in the Canadian West and garnered in an elevator at Fort William has been carried down the lakes by a Canadian vessel. The cargo in question reached Montreal about the middle of this month. At Montreal the cargo was transferred to an ocean liner for shipment to the Old Country.

To Captain Jerry Cavanaugh, of the steamer *Yorkton*, of the Matthews Steamship Co., was given credit for carrying the first cargo of the 1913 crop from a western Canadian granary. The *Yorkton* passed through the Welland Canal on Sept. 15 with 92,000 bushels of grain aboard.

For several years the owners of American freighters trading at the head of the lakes have cultivated a fondness for carrying the first yield of the Canadian West. This year they again renewed their efforts, but, contrary to expectations, they were outbid by a Canadian company, with headquarters in Toronto.

According to representatives of several freighters engaged in the grain trade, the prospects for a big season's business this year were never more encouraging. While the number of charters at present are considerably lighter compared with former years, indications point to a record season.

ANOTHER GRAIN ROUTE.

IT appears now to be certain that the Canadian Northern Railway will be prepared to haul grain over its new transcontinental line from Port Arthur to Sudbury, and then south to Toronto by the beginning of winter. This will be fortunate, inasmuch as, according to such authorities as Mr. John Aird, assistant general manager of the Canadian Bank of Commerce, and many others, the crop movement will be larger this

MARINE ENGINEERING OF CANADA

fall than it has ever been before. The fact of another grain route being opened from the West to the East does not necessarily, however, preclude the possibility of another grain congestion at the head of the lakes this year.

It is important in this respect to note that with the opening of the grain route the Canadian Northern Railway will be able to carry their traffic from British Columbia to the Atlantic by its own right of way. As the route east of Sudbury is not completed, all traffic must necessarily pass through Toronto. This new line is constructed with a view to its carrying heavy traffic.



TORONTO HARBOR CONTRACTS

THE tender of the Canadian Stewart Contracting Co., for another large section of the Toronto harbor improvement work, amounting to \$5,760,000, has

The terms of the contracts stipulate that the work in each case shall be completed within four years. Mr. Alex. C. Lewis, Secretary of the Harbor Board, stated that the actual work of building the sea wall and dredging the channel will be started next spring. During the winter, the firm will install the plant necessary for the carrying out of such large works, so as to be in a position to commence operations when the ice breaks up in the harbor.



MONTREAL HARBOR WORKS.

GOOD progress is being made with the various works in the harbor which are now under way. The concrete work of the substructure of the additions to the Harbor Commissioners' grain elevator No. 1 is progressing rapidly, and the concrete for the super-

In connection with the construction of the latter wharf, an excellent illustration has been given of the diminution in the velocity of the current throughout the harbor which has been brought about this season. The crib for the foundations of the wharf has been towed down the harbor by the Sir Hugh Allan, assisted by two tugs only, and placed in position. Formerly it would have taken at least eight tugs to have accomplished this task with safety, for once the current was allowed to swing the crib broadside on, there would be nothing for it but to construct another crib.



DREDGE CONTRACTOR'S LOSS.

MR. V. T. BARTRAM, a dredging contractor of Toronto, is a heavy loser by the recent gale which raged off the Gulf of St. Lawrence. Whilst bound



YARMOUTH, NOVA SCOTIA, AND ITS SHIPPING.

been accepted by the Dominion Government, according to an announcement received from Ottawa. A short time ago the same company was awarded the harbor dredging contract, totalling \$5,250,000.

The latest contract includes the construction of a breakwater from the Eastern Channel to Woodbine avenue, and the excavation of a ship channel 6,800 feet long and 400 feet wide from the eastern end of the harbor through the Ashbridge's Bay industrial district. This comprises the whole of the Government works, except the three lift bridges which are to span the eastern and western channels and the ship channel.

structure will commence being run in by September 1. The concrete of the superstructure of the additions to the Grand Trunk elevator has been completed to a considerable height, and work is being pushed night and day, the additions being brilliantly illuminated at night by means of a special installment of electric light. There is no substructure to these additions, a concrete superstructure being run up as soon as the piling is ready for it. The new high-level wharf at section 26 has virtually been completed, and the foundations laid for another high-level wharf at section 27, at the foot of Papineau Avenue.

from Murray Bay to Rustico, the heavy seas off Prince Edward Island swamped his No. 1 dredge, and the crew had a narrow escape from drowning. Two scows owned by Mr. Bartram, valued at \$8,000, were also driven ashore in the gale and became a total loss. The tug Mersey had her guards smashed off and her rudder unshipped. Whilst wallowing in the heavy seas she sprang several leaks, and was brought into Souris, P. E. I., with some difficulty. The total amount of loss sustained by Mr. Bartram is \$35,000, which is only partially covered by insurance.

JONAH AND THE WHALE.

THE Maritime Exchange Bulletin of New York received the following from an "Ancient Mariner":

"I read an article in the Boston Traveler and Evening Herald recently to the effect that a few sky pilots of the Methodist persuasion were having a little 'scrap' over 'Jonah and the Whale.' They do not seem to be sure as to whether Jonah swallowed the whale or the whale swallowed Jonah, and want the ancient fish story eliminated from the sailing directions. As I am always ready to referee a scrap of any kind, with all due respect to the cloth, I will tell what I know about it.

Verification Record.

"When I was a small boy, my folks moved to a seaport town where the principal industry was whaling. From the first day that I went down on the docks and listened to the stories told by the old blubber hunters, my one and only ambition was to go to sea on a whaling ship. My mother tried to talk me out of the notion, but the more she said on the subject, the stronger was my desire to go. She finally got me a berth on the Betsy Jane, Captain Tom Coffin, for a cruise to the Arctic and Western Pacific, where we intended to finish our catch and return home via the Cape of Good Hope, after making the voyage around the world.

"Everybody who has ever eaten a doughnut fried in whale oil knows Tom Coffin, the most successful shipper that ever sailed a blubber hunter. Joe Bunker was first mate. What he could not do with a harpoon is not worth mentioning. He was certainly 'some' on a long dart. We sailed away from our home port with only part of a crew, intending to call at the Cape De Verde Islands for the remainder. Our crew did not have a regular wage. They were on a 'lay,' or a portion of the catch, for their services, and the way they would soak these niggers was a caution. As they did not know the difference between a 50th and a 250th lay, they seemed to think the more figures there were, the better the lay, and usually found out their mistake at the end of the voyage.

"After leaving the Cape De Verde, we sailed south, got a few whales on the southern whaling ground, then went into the Falkland Islands for water and vegetables, then proceeded around Cape Horn to Honolulu, where we were to take on an extra supply of stores before proceeding to the Arctic. Honolulu was more of a whaling station at that time. It was isolated to a great extent, and whalers would go there to refit and sometimes land their oil to be re-shipped home on a merchantman. There was another reason—namely, if a sailor ran away we could always replace him with

a Kanaka—who was not any wiser on the lay question than the nigger was. I will add right here that if there was ever any industry in this country that needed Lawsonizing any more than the whaling and latter day merchant marine does, I have not heard of it.

"We were not long in Honolulu, as everything was ready for us to take on board, and we were soon on our way to the Arctic, where we caught so many whales that, before the days got too short, Captain Coffin decided to take a chance of filling up on the whaling ground in the Western Pacific; so we headed the Betsy Jane toward the equator, intending to get into the westerly current and cruise across the Pacific near the equator and enter the Indian Ocean via Ombay Strait.

When we were first on the whaling ground I was assigned to Mr. Bunker's boat. Mr. Bunker took an interest in me, and taught me all there was to know about handling a harpoon and managing a boat. I was an apt pupil. Everything always came easy for me on shipboard, and it was not long before I had charge of a boat. We cruised along among the islands, landed on some of them to get water and yams, fruit, etc., and often the natives would come off with green cocoanuts and other things to trade for tobacco. When we got over on the coast of Timor we found plenty of whales, and it was here that I had the greatest adventure of my life—one that I hope will settle the question of Jonah and the whale, and the sky pilots that got so excited over the question will shake hands and be good boys and let the ancient fish story remain where it is. We have got used to it. If you begin weeding out the old sailing directions, you will find a lot of things that are as much of a puzzle to the ordinary layman as this ancient fish story.

School of Whales Sighted.

"One day we sighted a large school of whales. There was a lot of excitement on board the Betsy Jane, as we only wanted a few more whales to fill the empty casks we had left. At the sight of these whales, visions of home began to float through our minds; so we worked with a will to get our boats out and after them. The first one that came up near my boat was a whale in every sense of the word. He had more barnacles on him than I ever saw on a ship's bottom when in the dry dock, and his back was bristling with rusty harpoons that he had collected in years gone by. However, when he came up again I added a couple more to this collection and sung out, 'Stern all!'

"Quick as a flash the whale hit my boat with his tail and sent us skyward at the rate of 20 knots. When I started to come down, there was the whale

standing right on end with his mouth open, and his throat looked like the entrance to the subway. I was going through the air so fast that I went in between his jaws and landed in his stomach before his jaws came to with a crash like the door of a pay-as-you-enter car. The air was not very good, but there was plenty of light, owing to the fact that the whale had made his breakfast off phosphorescent jelly-fish and squid.

"I stood there, dazed for a minute, when I noticed something that looked like letters on one of the glands of the side of his stomach. I walked over, took up a piece of jelly-fish so I could see to read, and there I saw, pricked in with India ink, the words: 'Jonah, B.C. 1685.' I had often heard my mother tell about the whale that swallowed Jonah, and I had often heard the old blubber hunters tell about a whale whose hide was full of harpoons, and who had smashed every boat that ever tackled him, and I began to feel blue. However, I took a good big chew of tobacco to settle my nerves, and on my way over to take a seat on the corner of the whale's liver to think it over, my foot hit something hard. I picked it up and found it was a horn-handled knife. It had Jonah's initials on one side of the handle, and a picture of the American eagle on the other.

"While sitting there, I noticed that the whale's stomach was not used to tobacco, so I took up the knife I had found and cut up the plug of tobacco I had with me and sprinkled it all over his stomach. It worked like a charm. In a few minutes the whale had convulsions; then his stomach turned inside out, and I landed in the water close to Mr. Bunker's boat that was towing a whale over to the ship. I told them where I had been, and about the inscription in the whale's stomach. They doubted my story until I showed them the jack-knife with Jonah's name on it. If that old Biblical story of 'Jonah and the Whale' is not true, put me down as a fit candidate for the Ananias Club."



BIG SHIP ENTERS PANAMA CANAL.

THE first large vessel to navigate the Gatun Lake section of the Panama Canal, 24 miles in length, a suction dredge, known as No. 82, left its moorings near the Gatun locks on August 24, and sailed, under its own steam, to a point north of Gamboa Dyke.

The dredge which has been tied up in Gatun for several months, waiting for the lake to rise to a sufficient height to enable it to make the trip, will undertake the removal of 150,000 cubic yards of silt deposited in this locality by the currents of the Chagres River.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

J. T. Home received a contract from the Dominion Government on September 4 for dredging in the Rainy River at a price of \$29,250.

Andrew Strang, collector of customs of the port of Winnipeg, and one of its oldest residents, died on September 4, after a brief illness.

Moise Cote, of St. Anicet, P.Q., has been appointed Wharfinger of the Government wharf at that place, in place of Norman Bethune.

Frederick Newton Malcolm, master mariner, Halifax, N.S., has been appointed an examiner of masters and mates, in place of W. R. Lugar, deceased.

Capt. James Reid, president of the Reid Wrecking Co., of Sarnia, died on September 2, in Detroit. For over forty years he had been the most dominant figure in the wrecking annals of the Canadian Lakes marine.

J. P. Jaffray, for sixteen years editor of the Galt Daily Reporter, left Galt on September 16, for Ottawa, whence he will proceed to New York and remain there two weeks before going to Philadelphia to take up his post as immigration commissioner for the Dominion Government.

Captain Fred. Smart, expert dredge-man, has just returned to Sarnia from Montreal, whither he went for a conference with A. W. Robinson, consulting engineer for the Imperial Government of India, preliminary to going to Glasgow, Scotland, where he will spend six or seven weeks superintending the construction and shipping of an extensive dredging outfit to Bombay, India.

John T. Ross, president of the Quebec Steamship Co., when asked if there was any truth in the story respecting the

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William Street, Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy Street, Kingston, Ont.; Capt. James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.
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GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

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President—A. A. Heard, Albany, N.Y.
Secretary—M. R. Nelson, New York.

THE SHIPPING FEDERATION OF CANADA
President—A. A. Allan, Montreal; Manager and Secretary—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; Grand Secretary-Treasurer—Capt. H. O. Jackson, 376 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

James T. McKee, Box 98 Fairville, N.B.
Grand President.
Thos. Theriault, Levis, P.Q., Grand Vice-President.
Neil J. Morrison, P.O. Box 238, St. John, N.B., Grand Secretary-Treasurer.
Jno. A. Murphy, Midland, Ont., Grand Conductor.
George Bourret, Sorel, P.Q., Grand Door-keeper.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

alleged sale of the Quebec Steamship Co., with its West Indies and Bermuda lines of steamers to the Canadian Transport Co., replied that the Quebec Steamship Co. had entered the merger known as the Canadian Transportation Co. Negotiations have been completed, and all that now remains to be done is the turning over of the securities.

Frederick Barlow Cumberland died at Port Hope, Ont., September 1, aged 67 years. Mr. Cumberland was one of the founders of the Niagara Navigation Co., and the illness which has resulted in his death came upon him about the time that the Niagara Navigation Co. was merged with the Richelieu and Ontario. He was a native of Portsmouth, England, and was born in 1846, his father being the well-known Col. Frederick W. Cumberland, an engineer and architect of considerable celebrity, and for many years managing director of the Northern Railway. After a successful career as a railway engineer, Mr. Cumberland abandoned railways for steamboats, and was largely instrumental in founding and fostering the large water traffic to and from Toronto Harbor. He organized the popular Niagara Navigation Co., and for eleven years managed the Collingwood and Lake Superior line of steamships with the same success, energy and enterprise which always characterized his undertakings.

ALLAN DIRECTOR APPOINTED TO C.P.R.

THE selection of Major Maitland Kersey to succeed Mr. Arthur Piers as chief manager of the Canadian Pacific Steamships, is expected to mark a closer co-working between the Allan and Canadian Pacific fleets, if that is possible. Mr. Kersey is a director of Allan Bros., and the Allan Steamship Co.

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto.	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John.	2	H. E. Berry,		G. T. G. Blewett,	36 Murray Street, St. John, N.B.
Collingwood,	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston.	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex. McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	Andrew T. Roy,	1212 Burrard St.,	E. Read,	859 Thurlow St.
Levis,	8	Helalre Mercier,	3 St. Joseph St.,	S. G. Guenard,	Launon, Levis, P.Q.
Sorel,	9	Geo. Gendron,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound.	10	W. Robertson,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor,	11	Alex. McDonald,	28 Crawford Ave,	Neil Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,		Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault Ste. Marie,	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown,	15	J. F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottet'n, P.E.I.
Twin City.	16	Arthur Abbey	Fort William, Ont.	John A. Smith,	Fort William, Ont.

BRITISH FIRM SECURE U.S. CONTRACT.

A BRITISH builder, on September 11, was awarded the contract for turbine drums for the newest American battleship, No. 39, at a little more than one-third the price offered by the lowest American bidder. The accepted bid, \$57,436, was submitted by New York agents of the Cyclops Steel & Iron Works, Sheffield, England.

It is exceptional for the Navy Department to send a contract abroad, but Acting-Secretary Roosevelt held that the action to-day was justified by the tremendous difference between the British and American prices. The Sheffield bid includes the payment of duty, and by giving the work to the foreign builder the United States saves more than \$100,000.

There were two American bidders, the Bethlehem Steel Co., \$169,568, and the Midvale Steel Co., \$160,272. The Carnegie Co., the only other domestic concern equipped to build the drums, did not seek the contract.

CANADIAN FREIGHT RATES.

W. BLACK NOBLE, writing to the "London Times" on the subject of Canadian freight rates, and with particular reference to the mission of H. L.

Drayton, Chairman of the Dominion Railway Board, who has met him, expresses the opinion that the Canadian Government would be adopting a sounder policy if, instead of advocating State control of ocean rates, they would consider the question in a more general sense apart from the Canadian millers.

Flour Rate Excessive.

The contention is that the rate on flour is excessive as compared with grain, and that the existing preferential tariff is practically neutralized by the exorbitant rates on westbound goods. He describes it as incredible that any body of right thinking men could entertain such proposals as are being put forward, namely:

1—That ocean carriers should be treated as, and if necessary legislated into, the position of common carriers.

2—That the Canadian Government should form a fleet of vessels of their own for the conveyance of eastbound produce and westbound merchandise.

3—That powers under the three-mile limit of territorial jurisdiction should be exercised in connection with steamers trading to Canadian points.

It would be much better, concludes Mr. Noble, if instead of spending money in establishing a State Department, a very dilatory and inefficient method of attain-

ing their object, they employed money in forming a fund for subsidizing merchants who were unable to carry on profitably a business which is necessary to the well-being and prosperity of the country.

Means Trade Restriction.

By dealing with the situation in any other manner, the inevitable result would be the restriction of export and import facilities, an eventuality which for a growing country like Canada, ought not to receive the most passing consideration on the part of those entrusted with the management of her business.

**MONTREAL HARBOR BOARD AND GRAIN TRADE.**

VARIOUS tables of statistics having been quoted in support of the contention that the Harbor Commissioners of Montreal should provide more storage facilities at that port for grain, tables which differ almost as widely from each other as from the facts, the suggestion has been made that the official figures of grain trade for the port should be republished.

In 1898, the export trade of the port in grain was over 40,000,000 bushels for the year. From that date grain exports steadily declined until, in 1905,

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the official return showed that the volume of business done was only 13,455,413 bushels. From 1905 there has been an increase, until last year the figures nearly rose to those attained during 1898. The details for each year of the increase are as follows:—

1906	28,812,607
1907	32,783,018
1908	31,421,082
1909	27,959,395
1910	26,859,268
1911	29,893,184
1912	38,918,264

From the above figures it will be seen that the increase since the lean year of 1905 has been irregular and fluctuating:

but the indications are that the figures for the present year will top those of 1898, a fact which lends point to the contention of grain exporters that further storage facilities should be provided. Their demand is being considered by the Harbor Commissioners, who have consulted the exporters as to the site of a new elevator, whenever its erection shall have been decided upon. The Harbor Board will likely arrive at a decision shortly, and its announcement is being anticipated with interest.



INCREASE GRAIN STORAGE NEXT YEAR.

A STATEMENT has been given out at the offices of the Montreal Harbor Commissioners to the effect that the Commissioners, after carefully considering the representations made by the deputation of grain exporters who waited on them some time ago, had decided that the grain storage facilities of the port would have to be increased; but a commencement will not be made with the work before next spring, at the earliest. As to whether the programme of extension will include the erection of a new elevator is not yet certain, but, in any case, further additions will be made to the existing elevators controlled by the Harbor Commission.

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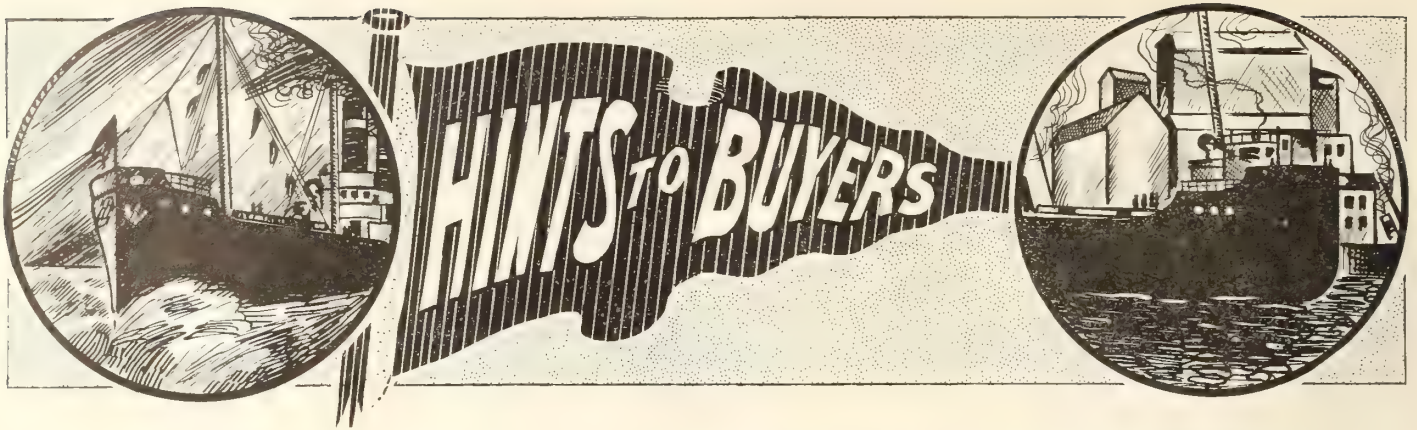
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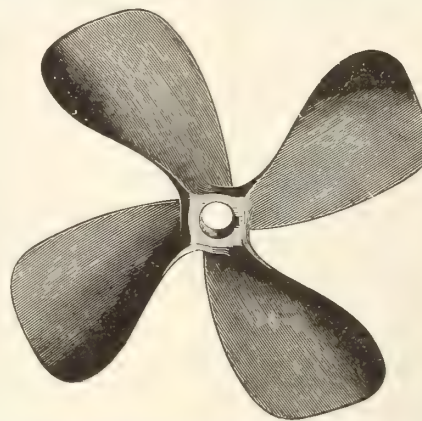
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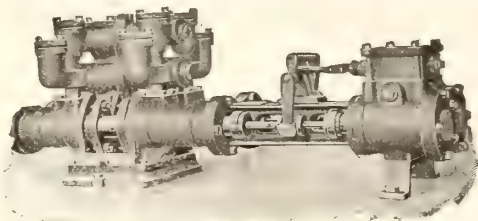
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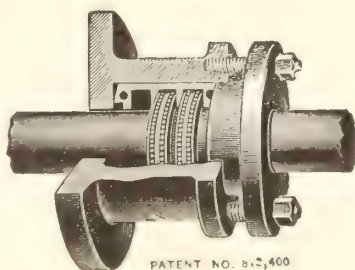
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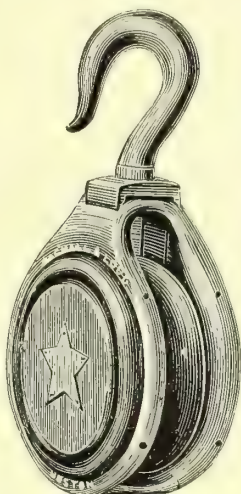
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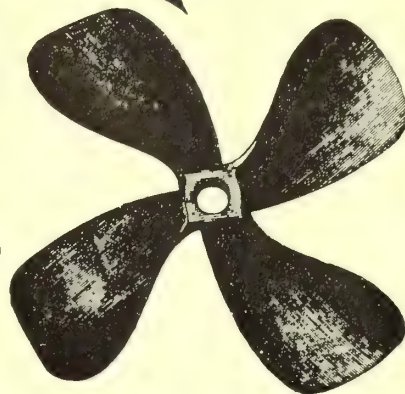


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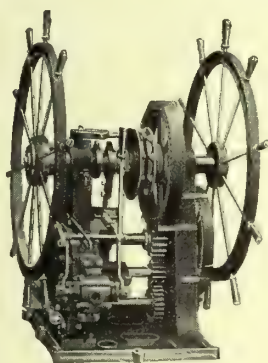


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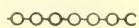
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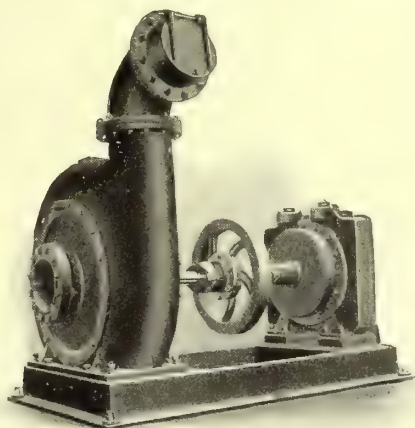


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MONTREAL, Eastern Townships Bank Bldg.

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LONDON, ENG., 88 Fleet St.

Vol. III.

Publication Office, Toronto—October, 1913

No. 10



Dredge "Port Nelson" Built by Polson Iron Works Limited, of Toronto

Order placed by Department of Railways and Canals, Dominion Government on the 1st day of April, 1913. Dredge reached Port Nelson after voyage of 3500 miles on the 27th of September.

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Polson Iron Works Limited, TORONTO ONT.

Dredge portnelson in spite of many difficulties encountered enroute arrived safely on Saturday twenty seventh time of passage sydney bar to portnelson bar twenty days six hours. Dredge behaved splendidly throughout voyage congratulate you on output.

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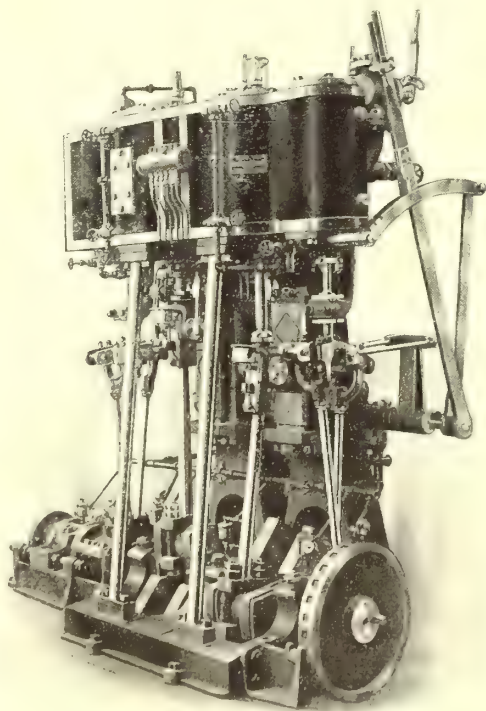
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By the Business Press of America

THE Federation of Trade Press Associations in the United States in Eighth Annual Convention assembled at the Hotel Astor, New York, September the 19th, 1913, made the following Declaration of Principles:

1. We believe the basic principle on which every trade paper should build is SERVICE—service to readers and service to advertisers, in a way to promote the welfare of the general public.
2. We believe in TRUTH as applied to the editorial, news and advertising columns.
3. We believe in the utmost frankness regarding circulation.
4. We believe the highest efficiency of the Business Press of America can be secured through CIRCULATIONS OF QUALITY rather than of Quantity—that character, and not mere numbers, should be the criterion by which the value of a publication should be judged.
5. We believe in CO-OPERATION with all those movements in the advertising, printing, publishing and merchandising fields which make for business and social betterment.
6. We believe that the best interests of manufacturers, the Business Press and consumers can be advanced through a greater interchange of facts regarding merchandise and merchandising and to this end invite co-operation by manufacturers and consumers.
7. We believe that the logical medium to carry the message of the manufacturer directly to the distributor and the user is the Business Press.
8. We believe that while many advertising campaigns may profitably employ newspapers, magazines, outdoor display, etc., no well rounded campaign seeking to interest the consumer or user is complete without the Business Press.
9. We believe in co-operating with all interests which are engaged in creative advertising work.
10. We believe that business papers can best serve their trades, industries or professions by being leaders of thought; by keeping their editorial columns independent of the counting room, unbiased and unafraid; by keeping their news columns free from paid reading notices and puffery of all kinds; by refusing to print any advertisement which is mis-leading or which does not measure up to the highest standards of business integrity.

* * * * *

These principles, lofty though they may seem, have constituted our platform for years. We preach them and try to practice them.

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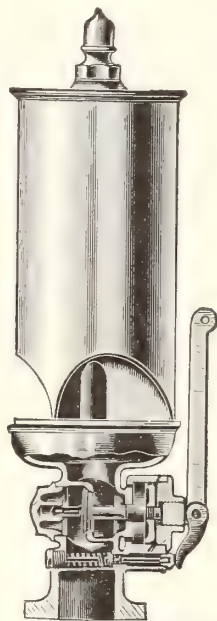
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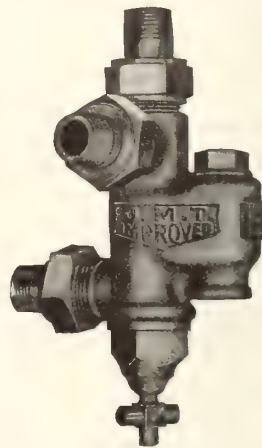
They effectively stand the wear and tear to which marine goods are subjected — their service means protection as well as economy.

It will be to your benefit to get in touch with us, and learn all about any line or lines in which you are interested.

All inquiries receive our prompt and careful attention.



Marine Chime Whistle with compound automatic valve. Made in various sizes. Suitable for all pressures.



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Electric Deck Light,
Heavy Type.

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Diesel-Electrically Propelled Lakes' Vessel "Tynemount"

By C. T. R.

In our July issue there was published the substance of a paper read before the Institution of Naval Architects, during their Summer Meeting at Glasgow, Scotland, in the course of which the various features entering into the construction and propulsion of our Lake and Canal vessels were pointed out and discussed. Considerable space was devoted to the practicability of Diesel-Electric Propulsion, and its application to the Lakes vessel "Tynemount" then building. The present article deals with the complete vessel and an illustrated description of her machinery equipment.

THE "TYNEMOUNT" is an up-to-date electrically driven cargo vessel intended for service on the canals and Great Lakes of North America. She is 250 ft. in length by 42 ft. 6 in. beam, and 19 ft. depth moulded.

The vessel has two masts, forecastle and navigating bridge forward, and poop aft. There is one steel deck, and three cargo holds, with seven large hatches. On the deck are steam winches for working the cargo with three 3 ton derricks.

The deck machinery consists of steam windlass, steam steering gear, and three steam winches for working cargo and warping; electric light is fitted throughout. This auxiliary machinery is supplied with steam by two Cochran donkey boilers placed in the poop and fired with oil fuel.

The vessel has a double bottom throughout, with heavy flush fitted tank top plating. Under the cargo holds the double bottom is adapted for carrying water ballast, as is the forepeak, while the tank under the engine room and the after peak may be used for oil fuel. There are also two tanks for oil fuel on the deck forward of the poop bulkhead. In the forecastle is the accommodation

for the officers, crew, and oilers, while above are the captain's sleeping room and his office, together with wheelhouse, etc. In the poop are the rooms for the engineers, the galley, the dining saloon and the crew mess room.

Among other special features may be mentioned a strong oak fender along the sides of the vessel and forward for protection in the canal locks, a strong oak quarter badging round the stern, "wrecking wells," i.e., vertical trunks to give access from the deck to the double bottom when the holds are full of cargo, bowsprit for steering, etc. The machinery is accommodated right aft under the poop.

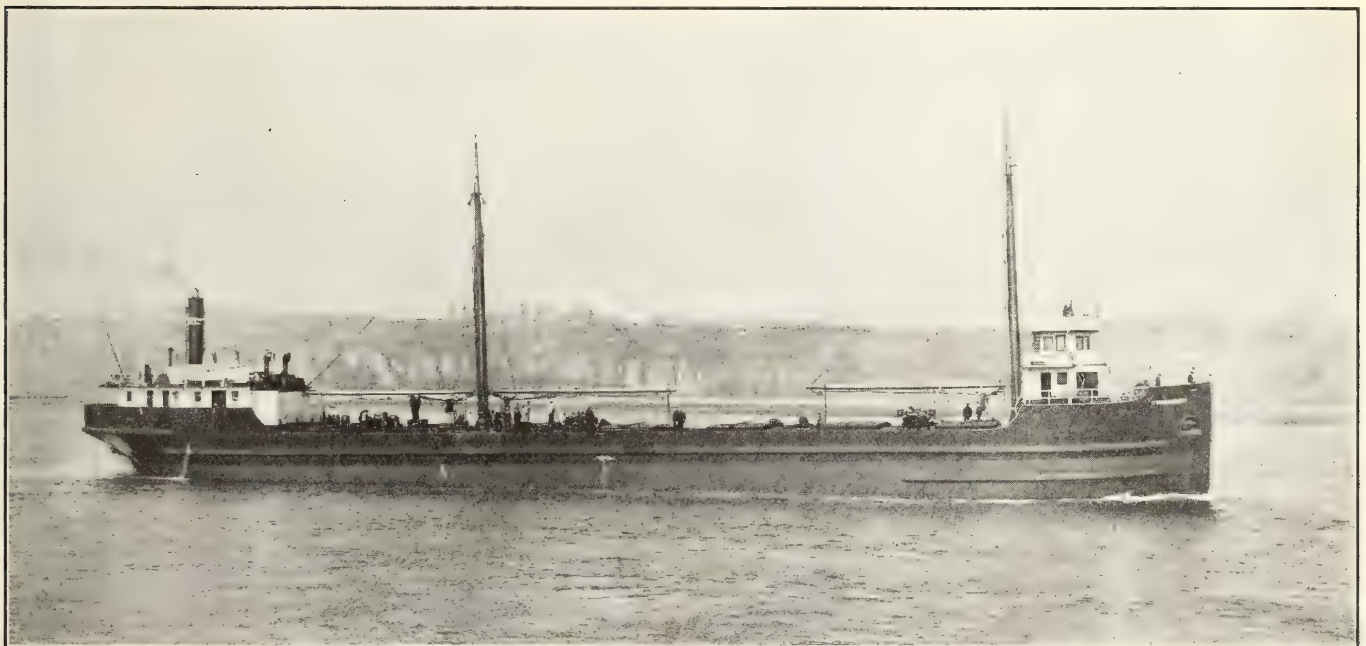
Diesel Engine Equipment.

The prime movers of the installation consist of two 6-cylinder high-speed engines of the well-known "Mirrlees-Diesel" type, as manufactured by Mirrlees, Bickerton & Day Ltd., Hazel Grove, near Stockport, England. They are each capable of developing 300 b.h.p. at 400 revs. per minute on the 4 stroke cycle, the diameter of the cylinders being 12 in. and the stroke 13½ in. The engines are totally enclosed, forced lubrication being employed throughout.

A substantial bedplate, cast in two

pieces and bolted together, joins with the alternator bedplate at the flywheel end of each engine, the whole being secured to the raised engine seatings which form part of the ship's structure on both port and starboard sides of the engine room. The six cylinders of the engine are divided into two groups of three cylinders each, the vertical shaft which drives the cam shaft being placed between the two groups. The crank shaft is made in two pieces, the gear wheel which transmits the motion to the vertical shaft being bolted between the two flanges of the central coupling, and these flanges are turned solid with the shafts.

The engines which are coupled to the alternators in the usual manner are placed on the forward end of the machinery space, on the port and starboard sides. A suitable hand lever barring gear working in an internal rack on the flywheel of each engine provides for turning the engine when required into the starting position. Starting is effected by means of compressed air, three cylinders only being fitted with starting valves. These are arranged on the three cylinders at the flywheel end of the engines, and their operation is rendered



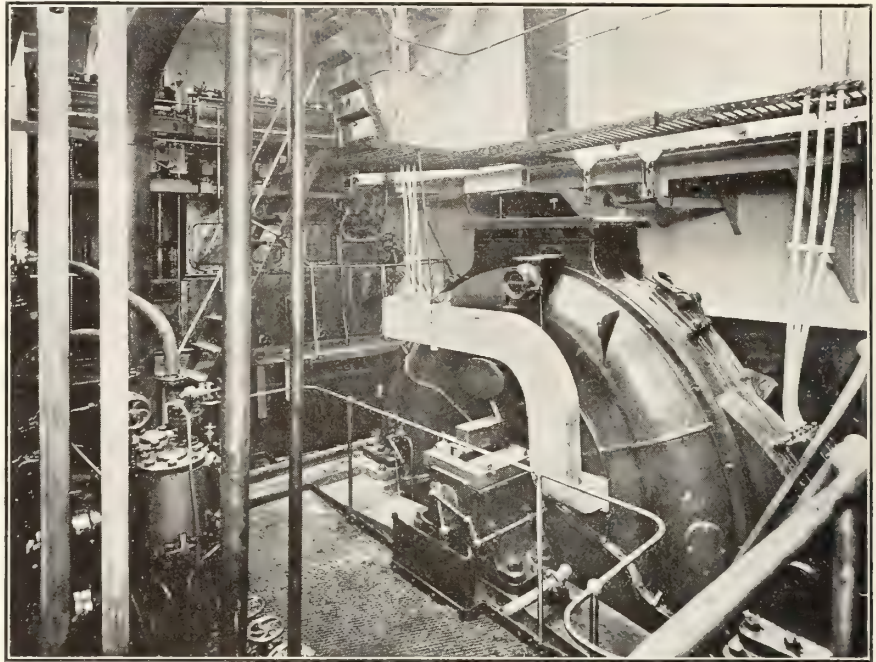
DIESEL-ELECTRICALLY PROPELLED LAKES VESSEL "TYNEMOUNT."

easy for the engineers in charge by a system of bell crank levers and coupling rods transmitting the motion from a control pillar placed on the engine room floor in close proximity to the air receivers of the engines. A device for stopping the engine and means of controlling the amount of air delivered by the air compressor are also provided on the same control pillar. Near at hand is the electric controller of the transmission system; the whole providing a compact and centralized arrangement for the operation of the propelling machinery. At the after end of each engine, a 3-stage air compressor is fitted, direct driven from an extension of the engine crank shaft. This extension also provides means for driving the lubricating and circulating water pumps.

The two groups of cylinders comprising each engine are carried by two enclosed type columns, each cast in one piece and provided with inspection doors of ample size. To these columns on the front or cam shaft sides of the engines, cast iron brackets are fixed, which support grating platforms running along the whole length of each engine on the front side. These platforms provide easy access to the valve gear and valves. The valves are situated in the cylinder covers, the fuel valve being of the ordinary needle type opening vertically upwards; the exhaust and air valves open downwards, and all operated by cams and levers in the usual way. An important feature of these levers is the provision of a hinged and bolted joint in each, which allows by the undoing of one bolt, any lever to be folded back; by this means the work of withdrawing the valves is reduced to a minimum. All the valve seats are made separate from the

cylinder covers, and can be withdrawn bodily with the valves. Spare valves and seatings are carried, and thus all grinding-in can be done on the bench at

Fuel oil is fed by gravity to the fuel pump suction chamber from the ready use tanks, which are situated on the forward bulkhead of the engine room.



VIEW OF ENGINE ROOM LOOKING AFT, SHOWING PROPELLER MOTOR.

the engineer's convenience. The pistons are of the trunk pattern and have separate heads, and the top end of the connecting rods are fitted with gun-metal bushes working on case-hardened piston pins.

The fuel pumps for delivering oil to the cylinders are situated on either side of the vertical shaft gear-casing, and are driven by eccentrics from the camshaft. Each of these eccentrics operates a small crosshead to which are fitted the three plungers of each pump.

The amount of oil passing through the cylinders is determined by the governor, which is fitted on the upper portion of the vertical shaft. A system of coupling rods and levers is connected from the governor arm to a small spindle passing through the fuel-pump suction chamber and, to this spindle, tappets are fixed which determine, according to the position of the governor, the length of time the fuel-pump suction valves remain off their seats, and, until the suction valves are closed, no oil will be

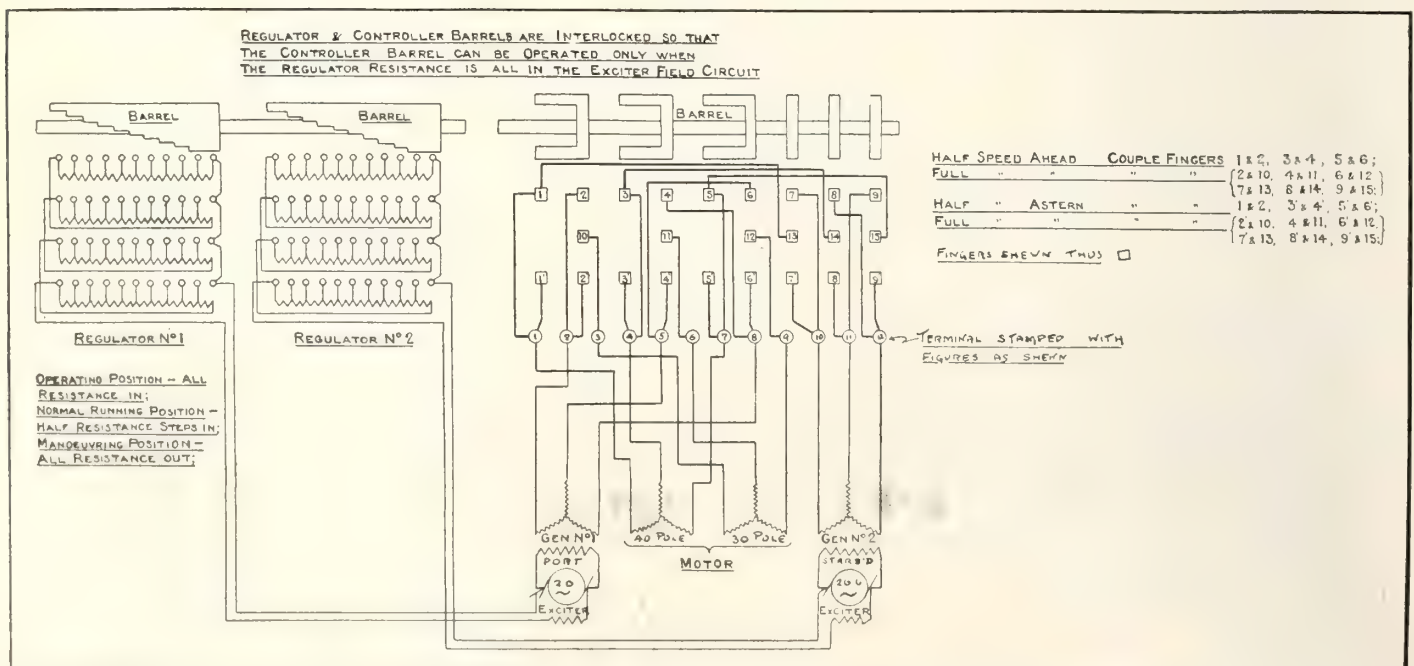


DIAGRAM OF CONNECTIONS, DIESEL-ELECTRICALLY PROPELLED VESSEL "TYNEMOUNT."

delivered to the fuel valves on the cylinder covers.

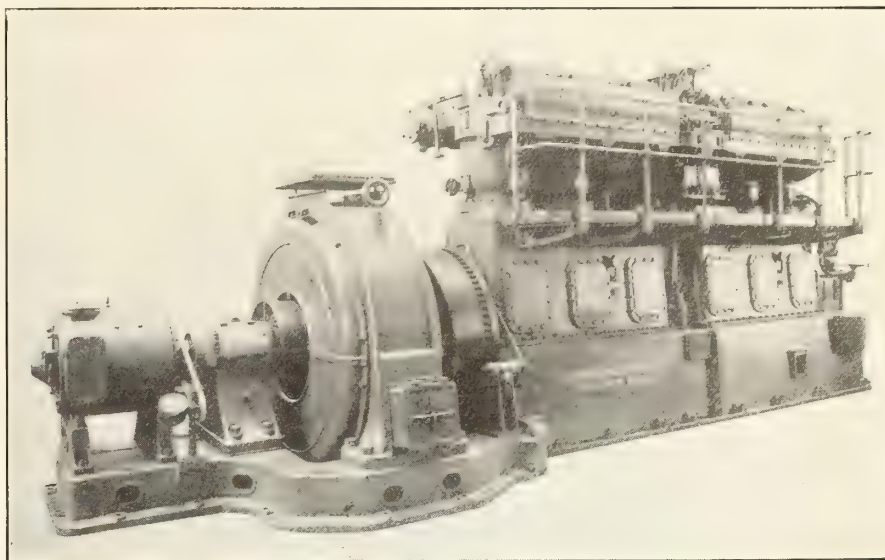
The circulating water after passing through the engines goes to the exhaust pipes, which are water cooled. From thence it passes from each engine through a water-flow indicator into a branch piece from which two pipes are led, one pipe going to the discharge valve on the ship's side and the other by means of a bye-pass to the suction side of the circulating pump. By this means, warm water can be mixed with the incoming water from the feed traps when the ship is sailing in cold waters. When the ship is running in fresh water, it will be possible by means of a special arrangement to pass the hot circulating water from one engine into the feed tank of the donkey boilers, and when the engines have been stopped and are cooling down, it has been arranged that the sanitary pumps may pass circulating water through them and thus lessen the chances of precipitation of salts or alkaline matter in the jackets.

Electrical Equipment.

The electrical equipment consists of two Mavor & Coulson 3-phase alternators each direct coupled to one of the Diesel engines. The alternators when running at their normal speed of 400 r.p.m. each give an output of 500 volts and 270 amps. per phase, which absorbs the full power of the engine. They are provided with six and eight poles respectively making the frequency of the current 20 periods per second, and 26.6 periods per second respectively. An ex-

citer is direct coupled to each alternator, and is capable of giving an exciting current of 30 amps. for normal working, which can be increased up to 50 amps. while manoeuvring.

tively, they give the same synchronous speed of 80 rev. per minute. The motor will then absorb the full power of both engines and drive the propeller to which it is direct coupled at a speed



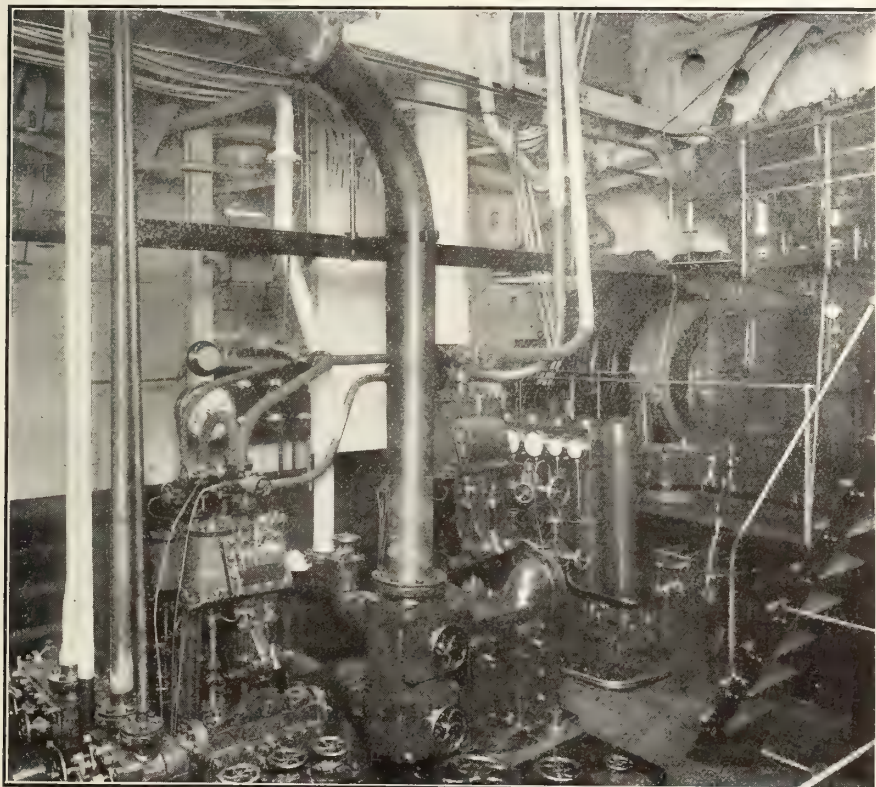
COMBINED GENERATING SET.

The current from these two generating sets is led to a 500 b.h.p. Mavor & Coulson Patent Induction Motor of special construction. The rotor of this motor is of the squirrel cage type, but the stator is provided with two different and entirely separate windings, one of 30 and the other of 40 poles. When these two windings are supplied with current at 20 and 26.6 periods respec-

of 78 revs. per minute. This propeller speed corresponds to the fastest speed of the vessel.

In order to obtain a slower speed, the connections are altered so that the alternator giving 20 periods supplies the 40 pole winding of the motor; the alternator giving 26.6 periods being shut down and the 30 pole winding of the motor being also out of use. The synchronous speed of the motor with the propeller is now reduced to 60 revs. per minute. One of the engines only is available, but as the speed of the ship is reduced to about three-quarters of the normal, half of the total h.p. is ample, and the great advantage is obtained of being able to entirely shut down that part of the plant which is not required at the low speed. It will be noted that the two alternators, when both are at work, are connected to entirely separate circuits, and are, therefore, never run in parallel. The paralleling two alternators, necessitating that they should be run up to speed and synchronized before being switched on to the load, is quite unsuitable for ship work; this operation not only requiring skill and care but involving considerable delay in starting the propeller motor. The motor is readily reversed by interchanging the connections of two of the phases.

The switchgear by means of which the necessary changes of connection are made is extremely simple. It consists of two parts—a main switch of the tramway controller type having five different positions, "Full ahead," "Half ahead," "Stop," "Half astern," "Full astern;" and of a second switch, the



VIEW OF ENGINE ROOM, STARBOARD SIDE, SHOWING ONE GENERATING SET.

purpose of which is to introduce resistance into the shunt circuit of the exciter.

The contacts of both switches work under oil, but it is inadvisable that the contacts of the main switch should be required to break the large main current flowing to the motor. The two switches are, therefore, interlocked so that it is impossible to work the main switch except when all the resistance has been introduced into the exciter field coils. There is then practically no excitation and the whole system is "dead." With the resistance in the exciter field circuit, the main switch can be moved to any one of its four working positions, and when the main connections have been made for the new running position, the shunt switch lever is pulled over so as to cut out the resistance and restore the excitation. Until the main switch is definitely on one set of contacts, the shunt switch is locked so that the excitation cannot be restored.

Handling of the Ship.

It will be seen that the whole handling of the ship can be carried out by means of two levers which are so interlocked as to be practically fool proof. In the present instance, these switches are in the engine room but it is evident that by lengthening the connecting cables they could be placed on the navigating bridge. The number of electrical instruments provided has been kept down to a minimum, there being provided only one ammeter and one voltmeter for each alternator, and an ammeter and voltmeter for each exciter. The handling of the switchgear is so simple that there is no necessity for multiplication of measuring instruments. The electrical drive permits the speed of the ship to be altered without altering the engine speed. It also permits convenient gear ratio to enable the engines and the propeller respectively to be run at their most efficient speeds, and also provides for the ready reversal of the propeller while the engines continue to run in their normal direction.

In addition to the above advantages, it is found that in many cases the system allows of a reduction in the machinery space and also in the bunker space required, thus increasing the cargo capacity of the vessel. As a subsidiary advantage, it lends itself readily to distant control, and, in any case where it may be found advisable, the switchgear can be put on the bridge and the control of the motor driving the propeller be put into the hands of the navigating officer.

The system of electric drive is that designed by Mr. Henry A. Mavor who has described the system and discussed

its advantages in papers to the "Engineers and Shipbuilders in Scotland" to the British Association in 1911 and 1912, and, in connection with Mr. John Reid, to the Institution of Naval Architects in June, 1913.

The "Tynemount" has been built by Messrs. Swan, Hunter & Wigham Richardson Ltd., of Wallsend, to Classification of British Corporation B.S., and to the order of The Electric Marine Propulsion Co., Ltd., a Company formed to

doing considerable damage to her bottom. Attempts were promptly made by tugs to pull her off, but without avail, and the vessel remained aground until September 26th, by which time sufficient of her cargo had been discharged into lighters to enable her to be floated. She then returned to her berth under her own steam, and at once commenced to discharge the balance of her cargo of grain. This proved a tedious business, owing to the lack of mechanical unload-



CANADIAN PACIFIC S. S. "MOUNT TEMPLE" IN FLOATING DRYDOCK "DUKE OF CONNAUGHT," IN MONTREAL, OCTOBER 9, 1913.

develop the system associated with the name of Mr. H. A. Mavor.

A preliminary light draft sea trial of the "Tynemount" took place last month, when all of the machinery was found to work satisfactorily. In order to secure more reliable data, a second trial will take place shortly with a full cargo on board, thus, permitting the propeller to be fully immersed.



S.S. "MOUNT TEMPLE" REPAIR.

ONE of the biggest jobs so far undertaken by the Canadian Vickers Company was that involving the repair of the C.P.R. liner Mount Temple. This vessel left Montreal for Antwerp at dawn on September 24th last, with a grain cargo of 120,000 bushels. When opposite Longueuil, she got out of her course and ran aground on a mud bank,

ers constructed to enter a hold as deep as that of the Mount Temple, consequently it was not until Sunday, October 5, that the vessel was towed down to Maisonneuve to enter the "Duke of Connaught" floating dry dock. She entered the dock at 12.50 p.m. and was centred by 1.10 p.m.; the powerful pumps of the dock being started at 1.15 p.m. Fifteen minutes later the liner's keel touched the blocks and by 3.45 p.m. the dock was dry.

An examination was at once made and revealed the fact that the liner had sustained considerable damage. Several plates forward and some amidships had been dented and pierced, and from the gaping seams, stones, some of which were nearly as large as a man's head, were pulled out, showing that when the ship struck the mudbank, or, as her officers claim, before she did so, she

struck something very much harder than mere mud.

The Canadian Vickers Co. put every available man to work carrying out the repairs as soon as the official survey of the ship's injuries had been made by Captain Reid, port warden. Work was carried on day and night, and by Friday night, October 10, the damage had been made good. However, the Mount Temple was not undocked until mid-day on Sunday, October 12, owing, it is understood, to the company having been requested to carry out some further work on the hull which it was considered advisable to attend to while a good opportunity offered. The repairs effected were of such a nature as to enable the vessel to cross the Atlantic with a full cargo, and, on leaving the dock, she at once returned to her berth and commenced loading up again with grain and deals.

The fact that the Canadian Vickers Co. were able to handle this job, even though their plant is as yet far from being completed, has caused great satisfaction in shipping circles and amongst business men generally, the important part which this large firm is destined to play in the marine development of the Dominion being fully realized and appreciated.

HIGH SPEED SHIP PROPELLERS.

A NEW propeller for high-speed ships has been patented by Sir Charles Parsons. It has blades of large area with a leading edge of scimitar or thrown-back shape. The formation, which is verified by experiment, induces a more regular stream-line motion of the fluid round the blade, and has a considerably improved efficiency at high-speeds, while showing some improvement at low speeds.

MOTOR SHIP "FORDONIAN."

THE following letter received from Mr. R. Duguid, Superintending Engineer of the Canada Interlake Line, Toronto, is of interest:—

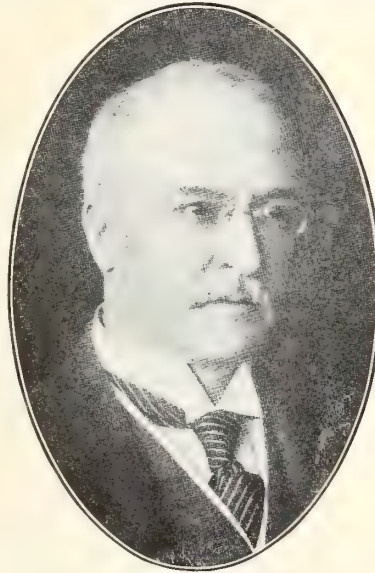
"I have now a first-class crew on the "Fordonian," and she is running well. Her speed averages about 9.75 m.p.h., and her consumption of fuel and lubricating oil is decreasing every day. We have no trouble whatever with the piston cooling water, all the glands are perfectly tight, and no water is ever seen on the flooring plates. Under the careful handling of Mr. McLaren, the chief engineer, we are getting all the steam we require from the donkey boiler; in fact, on the last trip down the canal, the boat had to be manoeuvred all the time, but she only used the auxil-

ary air compressor for a few minutes, all the air that she required being supplied by the main air compressor.

Our greatest trouble with the "Fordonian" engines has been the loose eccentrics on the shaft which work the scavenging air pump valves, but this has practically been overcome by putting a balance weight on the shaft which works these valves. So far as the vessel as a whole is concerned, she has, up to the present exceeded expectations.

DR RUDOLPH DIESEL.

DR. RUDOLPH DIESEL, whose disappearance was chronicled recently, was born in Paris in 1858, and although of German parentage, commenced his education in France. At the age of 13, he was sent to Augsburg and later to Munich. After serving for some time as assistant to Prof. von Linde, he spent a short time in practical work in Winterthur with Sulzer Bros., and was after-



DR. RUDOLPH DIESEL.

wards appointed Manager of the Paris firm for the manufacture of the Von Linde refrigerating machinery.

Ever since his early days at Augsburg and Munich, his main ambition, possibly an obsession, was to discover a prime mover with a much higher thermal efficiency than the steam engine. He designed an engine, and, in 1893, Messrs. Krupp and the Augsburg-Nuremberg Co. gave him financial assistance for its construction on the lines he had designed. This was a failure, indeed it exploded and nearly killed Dr. Diesel, but it showed at any rate that pure air could be compressed to such a degree that it would ignite oil fuel. A second engine was more of a success, but was not reliable, and was, moreover, attended with much danger in the working, but after several experiments with it, another

was constructed by the Augsburg Company in 1897, and this proved to be successful.

Since then, many improvements have been effected. The first Diesel engine installed in a ship was built in 1903 by Adrien Bochet and Frederic Dyckhoff, this being of 20 h.p. and having two pistons working in opposite directions in one cylinder on the 4-stroke cycle. The patents for Great Britain are owned by the Diesel Engine Co., which is now merged into the Consolidated Engine Manufacturers, Ltd.

The circumstances of the tragic disappearance of this great inventor are too well known to be reiterated, but if it be true that he is lost to us for ever—and we are reluctantly compelled to admit the great probability—the world has been deprived of a great inventor whose perseverance and tenacity of purpose won for him the admiration of all who know the story of his early failures. — Shipbuilding & Shipping Record.

THE "WHAKATANE" JUDGMENT.

JUDGMENT was recently given by the Court of Wreck Commission in the case of the stranding of the New Zealand liner Whakatane, in Indian Cove, early last month. Pilot L. T. Delisle was suspended until the end of the present season, and was ordered to pay all the costs of the Inquiry. The court further considered that Captain Squires, commander of the Whakatane, was deserving of censure for lack of initiative before the accident occurred; but, as was pointed out by the local management of the New Zealand line, the captain has never visited the St. Lawrence before, and so trusted to the pilot more than he would otherwise have done, being apparently under the impression that the Canadian law as to the relative status of captain and pilot, when the latter is navigating, was identical with the English law, under similar conditions.

THE SPEED OF MOTOR BOATS.

PEOPLE who have seen that speeds of 48 and 49 knots were achieved by the motor boats which raced recently in the Solent for the British International trophy are, no doubt, wondering why in much bigger craft—destroyers, for example—ordinary shipbuilders and engineers cannot do correspondingly well. Of the seven vessels which took part in the contest two—Maple Leaf IV. and Disturber III.—are close upon 40 ft. long; two—Izme and Crusader—are 33 ft.; one—Ankle Deep—is 32 ft.; one—Despujols II.—is 29 ft. 6 in.; and one—Despujols I.—is 23 ft. The horsepower of Maple Leaf's two engines is

750, and that of Disturber's six engines is 600. Each of the French vessels is of 400 h.p., and Ankle Deep, Crusader and Izme are each of 300 h.p. The average speed of the slowest of the seven over a course of 32.4 sea miles was nearly 42 knots, and that of the smallest at her best was about 5 knots better.

These high speeds are, however, due to the fact that, without exception, the vessels are hydroplanes. Four of the seven are variations of the Fauber idea—multi-stepped skimmers—and three are variations of the idea first embodied by Sir John Thornycroft in *Miranda III*. Crusader is, however, the only true Thornycroft skimmer of the three, Despujols I. and Despujols II., although single-step vessels, being more like what the Americans call "sea sleds."

Unfortunately, the skimmer idea cannot be applied to much bigger vessels than *Maple Leaf* and *Disturber*, which are almost up to the 40 ft. limit prescribed by the trophy rules. M. Fauber and, if our memory serves, Sir John Thornycroft as well, have expressed the opinion that hydroplanes of more than 15 metres—50 ft. in length—are impracticable. Judging from the case of *Brunhilde*, that seems, however, to be an over-estimate. The limit is some way short of 50 ft., so that there is not any immediate chance of the Atlantic records being wrested from the *Mauretania* and the *Lusitania* by a leviathan skimmer. Moreover, people who incline to think that the Royal Navy ought to employ a hundred or so of *Maple Leafs* for scouting had better defer coming to definite decisions on the subject until they see next year's races for this trophy.

Maple Leaf's gear makes a pleasant sort of noise, and the *Wolseley* engine in *Izme* is comparatively silent, but the machinery of all the others, especially that of the French boats, make a dreadful racket, which would speedily discover them to an enemy.

The truth is that all these high-speed motor crafts are just boxes of engines, and of no utility otherwise than in races. The makers of the petrol engines certainly deserve a great deal of credit for the efficiency to which they have brought that type of internal-combustion engine, but the speed for which the vessels driven by them are best known is, it should not be overlooked, very largely due to the hull forms.—*Syren* and *Shipping*.

SAFETY OF LIFE AT SEA.

MR. ALEXANDER JOHNSTON, Deputy Minister of Marine and Fisheries, has been appointed by the Government to represent Canada at the International Conference for Safety of Life at Sea to be held in London on November 12, 1913. Mr. Johnston will sail

from Canada on October 28, 1913, and will be invested with full powers to sign any Convention which may be deemed necessary.

This conference is one of great importance, as the result of the investigations and inquiries consequent upon the *Titanic* disaster will be placed before it. The British Board of Trade, it is understood, will have important proposals to make, as will also the representatives of the other great shipping nations. It is probable that many of these proposals will be adopted by the Government of Canada acting in conjunction with the British Board of Trade.

The matter of adopting means to secure the greater safety of life at sea since the *Titanic* disaster and other accidents has been engaging the attention of the Dominion Government, through the Marine Department. Both the Hon. J. D. Hazen, Minister of Marine and Fisheries, and Mr. Johnston have studied the matter carefully. A list of questions bearing upon the safety of life at sea and upon better means to secure it was sent out by the Department recently to the shipping companies of Canada, which are co-operating heartily on the subject.

MARINE DISASTER.

THE greatest marine disaster since the sinking of the *Titanic* occurred on October 9, when 136 passengers of the steamship *Volturmo*, which sailed from Rotterdam on October 2 for Halifax and New York, were drowned in stormy seas while trying to escape from the burning ship. The rest, 521 passengers and crew, were saved by ten steamships that answered the wireless S.O.S., but these ships had to stand by while the *Volturmo* burned, all of Thursday night, unable to help until the storm abated. They rescued the survivors in the early morning of Friday, and the *Volturmo* was abandoned at 9.20 a.m. that day.

WM. DENNY BROS. THOUSANDTH SHIP.

WILLIAM DENNY & BROTHERS, Leven Shipyard, Dumbarton, are to be congratulated upon the completion of their one-thousandth ship, which happens to be a vessel for the Irrawaddy Flotilla Company, for whom they have built 226 vessels. Their "No. 1" was laid down in 1845—the steamer *Loch Lomond*, for service on the Clyde—and their average annual output during the intervening 68 years is fifteen.

In the first year of the firm's existence, the tonnage produced was 365. In three years, they had reached 1,000 tons; in twenty years, 10,000 had been reached; in thirty-four years, 20,000; in fifty-one years, 30,000. So far their re-

cord year's tonnage stands to the credit of 1902, when they returned 41,979.

The value of the work has increased at a much greater ratio, as the firm has been in the first rank, confining themselves almost exclusively to the building of high-speed passenger steamers. They have also been active agents in developing the best practice alike in ship and engineering work. The interesting event in the history of the firm was celebrated by the men having a half-day's holiday on a Saturday, receiving time wage for same and a souvenir giving a record of the firm's work.

MONTREAL DRYDOCK TARIFF.

APPROVAL has been given by the Governor-General-in-Council of the following tariff of tolls, submitted by the Canadian Vickers, Ltd., in connection with their shipdock, the "Duke of Connaught," at Montreal; such approval being subject to the condition that the regulations may be amended at any time, should the Minister of Public Works consider it necessary to do so, and that the tariff may be likewise amended should it be established, to his satisfaction, that the rates levied are excessive:

Gross Reg. Tons.	1st day.	Follow- ing days.
Up to 1,000....	\$ 300.00	\$ 80.00
1,000- 1,199....	340.00	95.00
1,200- 1,399....	365.00	95.00
1,400- 1,500....	390.00	95.00
1,600- 1,799....	415.00	110.00
1,800- 1,999....	450.00	110.00
2,000- 2,249....	475.00	110.00
2,250- 2,499....	500.00	125.00
2,500- 2,749....	525.00	125.00
2,750- 2,999....	550.00	125.00
3,000- 3,499....	575.00	150.00
3,500- 3,999....	600.00	150.00
4,000- 4,499....	625.00	150.00
4,500- 4,999....	650.00	175.00
5,000- 5,499....	700.00	175.00
5,500- 5,999....	750.00	200.00
6,000- 6,749....	875.00	200.00
6,750- 7,499....	950.00	225.00
7,500- 8,249....	1,025.00	225.00
8,250- 8,999....	1,100.00	250.00
9,000- 9,999....	1,200.00	275.00
10,000-10,999....	1,300.00	300.00
11,000-11,999....	1,400.00	350.00
12,000-12,999....	1,500.00	400.00
13,000-13,999....	1,600.00	450.00
14,000-14,999....	1,700.00	500.00
15,000-15,999....	1,800.00	550.00
16,000-16,999....	1,950.00	600.00
17,000-17,999....	2,050.00	650.00
18,000-18,999....	2,150.00	700.00
19,000-19,999....	2,250.00	750.00
20,000-20,999....	2,350.00	850.00
21,000-21,999....	2,450.00	950.00
22,000-22,999....	2,550.00	1,050.00
23,000-23,999....	2,650.00	1,150.00
24,000-25,000....	2,750.00	1,250.00

The Canadian Government Fisheries Cruiser "Malaspina"

By "North Wall"

The data given in the accompanying article concerning the constructional, equipment and trial features, and the fact that the exacting guarantees relative to deadweight, draft, trim, stability, speed of vessel and smoothness of working of propelling and auxiliary machinery were satisfactorily met, warrant the belief that the Malaspina and her sister ship will perform their duties on service in a manner creditable to all concerned.

ON Saturday morning, July 5, the launch took place, from the Yard of the Dublin Dockyard Co., Ltd., North Wall, of the first of the two Fishery Cruisers which were ordered from the builders by the Canadian Government, for service on the Pacific Coast. As the vessel stood on the ways stripped of the staging which surrounded her during construction, she presented a very handsome appearance, and her lines were much admired and gave the impression of speed and seaworthiness. On leaving the ways, she was named "Malaspina," by Mrs. P. L. Warren of London, wife of the Canadian Government Superintendent of Construction in England.

Construction and Appointment Features.

The dimensions of the vessel, which has been built to take the highest class in Lloyd's Register of Shipping for both hull and machinery are:—

Length, B.P.....162 feet

Breadth 27 feet

Depth moulded 13 feet 11 inches

She has been constructed to a high-class specification covering all modern improvements and appliances applicable to a vessel of this type. Of the flush deck description having machinery amidships, she has a top gallant fore-castle and long bridge or awning deck amidships with commodious chart room at the forward end of same, surmounted by the navigating bridge with navigating house and pilot's room thereon. Under the bridge deck forward are handsome apartments panelled in oak for the use of the captain and officers and members of the technical staff, as well as a commodious and well appointed galley, pantry, lavatories, bath rooms, etc.

Under the after end of the bridge deck are situated the wireless office and operator's rooms, and immediately below same and under the main deck are the engineers' and officers' rooms, mess room, pantry, etc., all of which are comfortable and well arranged. The seamen and firemen are berthed on the main deck forward, immediately under the fore-castle deck in airy and well appointed apartments, having attached bath room and lavatory accommodation on a

much more generous scale, than usual. On the lower deck forward and entered by a companion-way from the main deck are to be found the petty officers' quarters, also a comfortable and airy apartment. Every consideration has been given to the vessel's seaworthiness, navigating facilities, and life saving appliances; and by transverse and longitudinal bulkheads, the vessel has been divided into no less than 20 watertight compartments.

On the bridge deck are four boats of large capacity all lowered by mechanical power, and the motor launch is fitted under Welin's patent davits of 4½ tons capacity. There are installed the usual steam windlass, steam steering gear and steam warping winch, also a very complete electrical installation, the accommodation and hold spaces throughout being lit by electric light as well as the navigating lights, compasses, telegraph and steering column. A powerful search-light is fitted on a small platform on the foremast and is actuated from the after end of the fore-castle deck from a point immediately behind the 6 pounder quick firing Hotchkiss gun which is mounted



CANADIAN GOVERNMENT FISHERIES CRUISER "MALASPINA."

on the fore-castle deck. A refrigerating plant and cold storage accommodation by J. & E. Hall, Ltd., is installed on the lower deck forward, and a Marconi wireless apparatus will be installed in due course, for which purpose the masts have been fitted of greater height than usual. Electric bells and steam heating and hot water systems are also included in the vessel's equipment.

Propelling Machinery.

The propelling machinery, supplied by David Rowan & Co., Glasgow, has been built to a very high class specification, and consists of a set of powerful triple expansion engines supplied with steam at 180 lbs. pressure from a large marine type boiler operating under forced draft on the Howden system. All the usual up-to-date contrivances for efficiency and economical working have been incorporated. The coal bunker capacity of the *Malaspina* is 180 tons, giving a radius of action under ordinary cruising conditions of about 6,000 miles at 9 knots speed.

Vessel Trials.

Two days' speed trials took place on the Clyde at Skelmorlie and between the Cloch and Cumbrae lights. The first day was occupied by the builder's trials, and, on the second day the official trials took place, when, with the specified dead-weight on board, the very high speed of 14.7 knots was obtained as a mean of six runs, three with, and three against the tide, on the Admiralty measured mile, and the revolutions corresponding to this speed were maintained during a six hours' continuous trial at full speed. The guaranteed speed was comfortably exceeded, and the engines worked with the utmost smoothness throughout, there being a total absence of vibration. The throttle valve was not touched during those trials, and the feed pumps and all other auxiliaries were kept going at their normal rate of working in service conditions. Records were taken at short intervals of the main engine performance as well as of all the auxiliaries, and at no time did the air pressure in the ash-pits exceed $1\frac{1}{8}$ inches of water. Starting, stopping and turning trials were eminently satisfactory. On the conclusion of the trials, the vessel returned to the Queen's Dock, Glasgow, to take on board coal and stores for her long voyage to Esquimalt, B.C., to which port she is now well on her way.

The *Malaspina* is intended for hydrographical work in addition to fishery duties, and has been equipped accordingly. The Marconi apparatus is of the latest and highest class, much of it being in duplicate, its weight alone amounting to some 2 tons. During a test of the wireless installation in Glasgow, the Eiffel Tower at Paris was spoken to.

The "*Malaspina*" has been built un-

der the superintendence of Mr. R. L. Newman, of Canada, chief superintendent of construction to the Canadian Government, and of his representative, Mr. F. L. Warren, of London, England.



LACHINE CANAL RETURNS.

THE further the season advances, the greater grows the increase in the volume of traffic through the Lachine Canal. Grain passing through the canal into the harbor to October 1 is close on $14\frac{1}{2}$ million bushels more than for the corresponding period of 1912. Flax seed is responsible for nearly six million bushels of the increase, and wheat for over five million bushels. The only decrease is in corn, caused by the failure of the crops in the States of the Middle West, a failure which has already resulted in two shiploads of corn being despatched from the Argentine Republic to Montreal direct. The coal trade shows a remarkable increase, the returns showing a total increased traffic of nearly 356,000 tons. All other analyses of the figures for 1912, compared with those for the present season, show increases as remarkable in their way as those quoted above.

Cereals.

Wheat brought down to the harbor measures up to 20,621,325 bushels for 1913 up to September 30 inclusive, as against 15,574,659 bushels for the corresponding period of 1912, an increase of 5,046,666 bushels. Corn shows a decrease of 55,697 bushels, the figures being 182,718 bushels for the present year and 238,415 for 1912. Oats have increased by 1,430,307 bushels, the quantity for this season to date being 7,907,473 bushels, as compared with 6,477,166 bushels for the corresponding period of 1912. Barley has increased by 2,160,614 bushels. For 1913 to date, the return is 2,623,258 bushels, as compared with only 462,744 bushels, an increase which is in one respect, more remarkable than any, in view of the slender proportions of the traffic last year.

Rye measures up to 270,249 bushels, the traffic in this cereal having been practically nil last year. Flax seed shows an increase of 5,596,566 bushels, the figures for this season being 5,971,311 bushels, as compared with only 374,745 bushels last year. The total quantity of grain brought down the canal for this season to date is 37,576,434, as compared with 23,127,729 bushels for 1912 up to September 30 of that year, an increase of 14,448,705 bushels.

Coal.

Coal brought down the canal this year, so far, weighs up to 679,763 tons, as

compared with 355,846 tons, and coal landed at various points on the canal banks 340,463 tons, as compared with 308,438 tons, an increase to the harbor of 323,917 tons and to the canal banks of 32,025 tons.

Permits issued to boats to pass through the canal this season to date number 4,933, as compared with 4,525, an increase of 408 permits.

General Comparisons.

The following comparisons are for the month of September only, this year and last, and not from the commencement of the season: Number of trips made last month, 1,389, as compared with 1,346, an increase of 43. Tonnage operated last month, 711,203 tons, as compared with 576,308 tons, an increase of 134,895 tons. The number of passengers carried last month was 16,309, as against 11,682, an increase of 4,627 passengers. Cargo tonnage operated last month totalled 601,350 tons, as against 447,493 tons, an increase of 153,857 tons.



BOAT BUILDERS ORGANIZE.

THE Canadian Association of Boat Manufacturers was organized at the Prince George Hotel, Toronto, on September 30, when two sessions were held and a committee was struck for the purpose of preparing the way for a motor-boat exhibition to be held in Toronto February 21 to 28 next. The objects of the association are to promote a fraternal spirit among boat manufacturers, eliminate unpleasant features of competition, and encourage higher standards of efficiency in boat building generally. The membership of the association will include boat manufacturers, marine engine manufacturers and naval architects. The headquarters will likely be in Toronto.

The officers elected are as follows:—President, H. Pitchburn, Gravenhurst, Ont.; First Vice-President, H. W. Going, Brockville, Ont.; Second Vice-President, Hugh M. Warnocker, Penetang, Ont.; Secretary, Adam F. Penton, Toronto; Treasurer, Claude H. Rogers. Executive Committee—M. M. Butler, Brighton; John A. Robinson, Toronto; H. L. Bastian, Hamilton; Fred Gilbert, Brockville; J. H. Roff, Orillia; J. W. Stone, Kenora, Ont., and A. L. Beaudry, Montreal.



The Hare Engineering Co. have moved from 14 King E. to 78 Duchess Street, Toronto, where in addition to convenient and commodious office quarters they will also have considerable warehouse and factory space.



LINE NORTH TO SKAGWAY.

THE establishment of a steamship line by the White Pass and Yukon Route in conjunction with one of the big American railways, probably the Chicago, Milwaukee & St. Paul system, in order to provide the Northern Transportation Co., with a direct service between Seattle, Vancouver and Fairbanks, Alaska, early next year, and the eventual linking up of one of the American transcontinental railways with the Yukon and Alaska with the Pacific and Great Eastern and the Grand Trunk Pacific Railways are foreshadowed.

Although no definite information is forthcoming at present on the point the trend of the negotiations would seem to indicate that the proposed steamship line, which it is said on reliable authority, will be operated in conjunction by the W. P. & Y. R. and the Chicago, Milwaukee and St. Paul Railway, would establish a direct service by water between the present terminus of the Chicago, Milwaukee & St. Paul Railway and the White Pass and Yukon Route, which would be superseded later on by the proposed direct overland railway.

The Chicago, Milwaukee and St. Paul, as is generally known, plans to extend its system to Vancouver, where it is understood, it would connect with the Pacific and Great Eastern Railway and the Grand Trunk Pacific, and be linked up eventually with the White Pass line and the proposed links of the latter in Alaska and the Yukon.

JAPANESE LINERS COMING?

ACCORDING to a shipping man, who lives in Liverpool, and who is in close touch with the shipping situation, there is a story going around the Mersey port that a Japanese line is to compete with the C.P.R. liners running to Vancouver, in an endeavor to win back part of the silk-carrying trade. He says:

"Two new liners of almost the same size as the Empress of Asia and Empress of Russia, but slightly faster—about half a knot, it is understood—are to be built at Kobe and Nagasaki

for the Osaka Shosen Kaisha's trans-Pacific service.

"As these vessels will not be ready to make their initial trips from Hongkong and Yokohama for two years, the company has decided to despatch to Vancouver two speedy 3,000-ton boats, which have been chartered from another Japanese concern for the route.

"This departure, it is said, is being made in order to secure once more some of the silk business which the new C. P.R. liners have captured. The Japanese steamers will connect at Vancouver with the Great Northern Railway and will be the largest ever constructed in Japan."



C.P.R. STEAMSHIP SERVICES.

IMPORTANT developments in the C. P.R. trans-Pacific service, the Pacific coastal service, and on the Great Lakes, were foreshadowed in some remarks made by H. M. Kersey, manager-in-chief of the C.P.R. steamship lines, on his return to Montreal recently, from a tour of the West. Mr. Kersey has noted the rapid growth of the services on the lakes and on the Pacific Coast, but has come to the conclusion that they must be supplemented by still further extensions and improvements in the near future, to enable the company's transportation facilities to keep pace with requirements. Changes will have to be made in the personnel of the staff employed and in other directions in order to ensure greater efficiency of service, and more new boats will be added before long. The volume of traffic handled by the company on the Pacific Coast and on the Great Lakes is four times what it was only two or three years ago, and is still rapidly expanding.



TERMINAL PLANS AT VANCOUVER.

OFFICIALS of the Great Northern and Canadian Northern Railways were in conference quite recently, discussing the question of a union depot. No definite decision has been issued as

yet. According to the city's agreement with the C.N.R., that railway was bound to build a station to cost \$1,000,000. The present station of the C.N.R. on the north side of the creek is entirely inadequate for the needs of a transcontinental railway.

The Pacific Great Eastern are working on their line to Fort George, and while their terminals are at North Vancouver, it is quite probable that freight and passenger facilities will be established in Vancouver on completion of the bridge over the second narrows of Burrard Inlet, which project has just been put up to the Provincial Government as a public undertaking. From Fort George to Vancouver, the Grand Trunk Pacific will possibly obtain running rights over the P.G.E.

On the strength of a statement by Hugh Sutherland, executive agent of the C.N.R. in Winnipeg, that wherever possible in Western Canada the C.N.R. and G.T.P. were planning to erect union stations, it is quite within reason to believe that a great union station will be erected in False Creek to be used by all four roads above mentioned.



SHIPBUILDING AT VANCOUVER.

IN the opinion of Sir Philip Watts, K. C.B., adviser on naval construction to the British Admiralty, who arrived in Vancouver, Sept. 29, warships of the larger classes could be built in Canada, but not as quickly or cheaply as they are turned out in England.

The best way, he declared, for Canada to start in on naval construction would be to have a few ships built in England at first and then have some built, partly in England and partly in Canada, and finally, when the workmen have been trained and the shipbuilding plants properly organized and equipped here, to build the ships altogether in Canada.

"Of course," he said, "the whole work could, no doubt, be done in Canada from the outset, but I think that the cost would be very great and the ships would take a much longer time to construct than is the case in England."

Building of the ships, however, he remarked, would not be the only thing that would have to be taken into consideration. There would be the machinery to build and instal, and the most important item of arming the ships when completed. At present Canada has not the facilities to do either of these things, he claimed.

Sir Philip Watts, K. C. B., F. R. S., Hon. LL.D., was born in 1850. He was educated at the College of Naval Architecture, and was a Constructor for the Admiralty until 1885, when he joined the firm of Armstrong, Whitworth & Co., and was in charge of the warship building department of that company. In 1901 he was offered and accepted the post of Director of Naval Architecture to the Admiralty, a position he filled until 1911, when he retired, and was appointed advisor to the Admiralty on Naval Construction. He is Chairman of the Federation of Shipbuilders. Sir Philip was created a knight in 1905 in recognition of his services to the Admiralty.

TRIALS OF POWER CRUISERS.

THE three power cruisers built at the Vancouver shipyards for the Dominion Government Fishery Service in British Columbia were given their trial runs on Oct. 5. The boats are designed with sunken pilot-houses, and their clear-cut lines, cruiser sterns, and coating of battleship gray paint gives them a trim and business-like appearance. They are of staunch construction, being intended for patrol work in all sorts of weather, while at the same time their power equipment and lines will enable them to do some swift cruising.

The cruisers are named the Egret, Heron and Raven. Two of the craft will patrol the west coast of Vancouver Island and the other will make Alert Bay its headquarters. They will be put into commission at an early date. Inspector Halliday of the Dominion Fishery Service represented the Canadian Government at the trials, while Capt. W. Watts of the Vancouver Shipyards, and E. B. Schock, the designer of the boats, officiated. The boats are equipped with 26-30 Buffalo engines, and a speed of nearly ten miles an hour was made on the initial trip.

The trial trip of the 45-foot power cruiser for the Provincial game warden, built at the Vancouver Shipyards, was also carried out recently. The boat has been christened the Watla, the Indian name for sweetheart. She will be used for patrolling around the coast of Vancouver Island and up the northern coast. Like the fishery boats she is painted a dull gray. The Watla made

nearly ten miles an hour on her trial trip.

Mr. Grant Williams, the Provincial game warden, and Mr. Terrell, his deputy, represented the Government at the trial, which was conducted by Capt. Watt on behalf of the builders, and Messrs. G. E. Bulkley, and Mr. W. A. Morris, representing the designers. Messrs. Morris, Bulkley & Halliday. The boat is now in commission.

VANCOUVER HARBOR WORKS GO TO BRITISH COMPANY.

J. G. WHITE, the eminent British harbor engineers, announce they have secured the contract, involving some six millions' sterling, for the harbor extension scheme in Vancouver, where the Provincial Government recently granted foreshore rights to the Vancouver Harbor and Dock Extension Co. Huddleston & Vigers and Hansley Heenan, late British Admiralty engineer, are also joint contractors.

It is intended to provide twenty-five miles of dockage at Lulu Island and Sea Island, and many miles for industrial sites and railway terminals. The company agrees to give the Government control over dockage rates that are to be charged, and also undertakes to allow all railways and steamship lines equal privileges. The agreement gives the Government the right to purchase at an arbitrated value the works which the company as a private promoter has placed at the disposal of the industrial world.

OVERHAUL G. T. P. STEAMERS.

FIRST of the Grand Trunk Pacific steamships to be withdrawn from the northern service for her annual overhaul will be the steamer Prince George, according to Capt. C. H. Nicholson, manager of the company. The semi-weekly service to Prince Rupert, however, is not to be discontinued until late in December, unless the passenger business takes a decisive drop prior to that time.

The Prince George ran ashore a short time ago, and dented a few plates in her hull, but the damage was not sufficient to cause the line to lay the ship up immediately for repairs. She will go into drydock as soon as taken out of service, and will probably be on the stocks for a couple of weeks. The Prince Rupert will take the George's place, later going into drydock herself.

THE MARINE MOTOR IN CANADA.

NOTWITHSTANDING the financial stringency which is affecting Canada to a marked degree, this is a wonderful year so far as motor-boating is con-

cerned, says the "Motor Ship and Motor Boat." Naturally, when money is tight, people economize on their pleasures, and no doubt the industry has been affected in common with other branches of commerce, but there are now more boats in use than at any other period. From the Atlantic to the Pacific, the reports are practically all to this effect.

Canada a Good Market.

Canada is a splendid market for all types of boats and engines. For the thousands of boats on the Inland Lakes, the demand is chiefly for small horsepower engines, while, on the St. Lawrence, the types are from the tiny pleasure boat up to the passenger and trade craft requiring Diesel engines. On the Atlantic, the fishermen are the best customers, and on the Pacific coast we find many boats, chiefly of the cruiser type, fitted with heavy-duty engines. They are very strongly constructed, for the coast is rugged. Motor-boat racing is becoming more popular every year, and this season has been notable for the increase of hydroplanes.

The Engine Market.

In this expanding motor-engine business, British firms have, unfortunately, very little share. It is true that several are represented on this side, but their productions are not pushed. Apparently, British firms are content to allow the Americans to secure the bulk of the trade without even an effort to divert it. Most of the better-known United States makers have agents in the principal cities and towns—and they may be given the credit for advertising and pushing their goods. They freely use trade papers, and also—which is important—have stocks on hand. Many dealers admit that if buyers desire a first-class engine, and will pay the price, nothing can beat British goods, but there is little on the market to compete with the comparatively cheap Canadian and American engines, which too often have to be scrapped after a short period of working.

In connection with British engines, it may be mentioned that the Thornycroft-engined cruiser owned by Mr. Cockburn, of Montreal, is to be used for a trip up the Labrador coast to Hudson's Bay. She will be the first internal-combustion-engine-driven craft to visit this wild district.

Sir Charles Ross, of Quebec, is having a cruiser built in Scotland in which two Thornycroft engines of the paraffin type will be installed. Sir Charles already owns a cruiser fitted with a Thornycroft engine.

A 100 h.p. Thornycroft engine has been purchased by Mr. Mark Werkman, of Montreal. This is installed in a cruiser-type runabout hull of solid ma-

hogany, 36 ft. long by 6 ft. beam, and is in use on the Rideau Lakes, Ottawa. The boat has a speed of just over 26 miles an hour.

The Canadian Government has given a contract to V. M. Dafoe, of Vancouver, to construct a motor lifeboat for use at Vancouver Island. The cost is \$10,000. She will be the first of the kind to be constructed in Canada, the policy of the Administration now being to have all vessels for Government service built in Canada. The vessel will be the third of the type actually in service. They are 36 ft. ocean-going vessels, unsinkable and self-righting.

"Ankle Deep," representing the Lake George Racing Association, is the winner of the gold challenge cup of the American Power Boat Association, which means that the cup leaves the shores of the St. Lawrence after being there for nine years. Many Canadians were present at the race at Alexandria Bay. "Ankle Deep" came in ahead on two following days, and on the second day did the 30 miles in 47 mins. 29 secs. The cup was defended by "Mitt II.," on behalf of the Thousand Island Yacht Club, the holders. On the second day, after an excellent start, she broke down completely, owing to a crank-shaft breaking, and had to be towed to the shore. The "P.D.Q. III.," a new hydroplane, owned by Mr. A. Graham Miles, of New York, also competed.

FURNESS LINER, S. S. "DIGBY."

THE S.S. Digby, illustrated here, is a passenger and cargo vessel of the following dimensions:—

Length 365 ft.
Breadth 50 ft.
Depth 25 ft. 6 in.

She was built by Irvine's Shipbuilding and Dry Docks Co., Ltd., West Hartlepool, England, to the order of Furness, Withy & Co., for their North Atlantic passenger, fruit and general cargo trade. The vessel has been specially designed for the carriage of Canadian fruit and dairy produce. An elaborate system of mechanical ventilation has been fitted to the holds and 'tween decks throughout.

Accommodation is provided for 58 first-class passengers at the fore end of the bridge space, the dining saloon being placed in a steel house there. The smoking room is located at the after end of the bridge deck. A large social lounge is also provided for first-class passengers. Thirty-two second-class passengers are accommodated at the after end of the vessel, with separate saloon, entrance hall, etc. Wireless telegraphy is installed.

The triple-expansion engines built by Richardsons, Westgarth & Co., Ltd.,

Hartlepool, have cylinders 28, 46 and 77 in. diameter, by 48-in. stroke, and three boilers, working under forced draught, supply the necessary steam.

ELEVATOR CONSTRUCTION.

MONTREAL members of the Canadian Society of Civil Engineers were treated on October 16 to an address by Mr. James Spelman vice-president of the John S. Metcalf Co., on the development of the construction of grain elevators, a branch of engineering which is attracting more and more attention in Canada yearly.

Mr. Spelman's address, which was illustrated with lantern slides, covered the history of construction from the day of the old-time millwright, who used only his natural judgment and common-sense in erecting a building of sufficient strength for the purpose required, to the present day, when enormous structures are put up, every feature of which is calculated to a nicety on engineering principles, stress, pressure, spout capacity and evenness of flow, etc., being determined before a steel bar is put up. Screens were shown of elevators in course of construction and completed, among the most modern of which were the Harbor Commissioners' elevators of Montreal.

Discussion.

Following the address, a discussion was entered into by the members, Mr. J. A. Jamieson, an elevator construction engineer, pointing out that the greatest problem in the handling of grain to-day was not so much the style of elevator construction as a matter of expedition and economy. Even with the latest appliances, the handling of grain in eleva-

tors, and the loading and unloading from cars and vessels, were subject to delays. Elevators in some cases had been put up more with a view to storage capacity than economic handling of grain per bushel, and he thought the problem of the future would be to secure expeditious and more economic handling.

Mr. F. W. Cowie, chief engineer of the Montreal Harbor Commission thought the construction of elevators would for a long time remain a field for specialists, on account of the special design and intricacies of the machinery required. It was pointed out that the Montreal Harbor Commissioners' elevators had tremendously increased the grain capacity of this port. In the past six years elevators had been constructed in Montreal at a capital cost of four and a half million dollars, handling at the rate of forty-five million bushels a year, and earning a revenue of \$250,000, while the grain was handled in them at a rate of 7-10 of a cent a bushel.

Mr. C. N. Monserrat, chairman and chief engineer of the Quebec Bridge Commission, presided at the meeting, which was well attended.

SIGHT TESTS.

THE British Board of Trade has decided to make the following modification in the standard of form vision to be required from candidates for certificates of competency, on and after January 1 next.

Instead of the requirement previously proposed of normal vision in one eye, and one half, or, in the case of certificate holders who are candidates for high certificates, one-third normal vision in the



FURNESS, WITHY & CO. S. S. "DIGBY."

other, a candidate will only be required to possess normal vision when using both eyes together, or, at his option, either eye separately. That is, he will be considered to have passed if, with both of his eyes open or with one of them closed, he can read correctly at least nine of the twelve letters in the sixth line, and at least eight of the 15 letters in the seventh line of the test sheets used.

The Board has further decided that a candidate who already holds a certificate of competency of any grade, and who is presenting himself for examination for a higher certificate, shall not be required to undergo any color vision test. The examination of officers who hold certificates of competency and who present themselves voluntarily for the sight tests only, will be confined to the form vision test.

C.P.R. AND AUSTRIAN GOVERNMENT.

IN connection with the Austrian situation, the following official statement has been issued by the Canadian Pacific Railway Co. in Montreal:—

Seeing that considerable misconception appears to exist as to the nature of the activities of the Canadian Pacific Railway on the Continent of Europe, it should be explained that in conducting its passenger business, strict instructions have been issued to all Canadian Pacific agents on the Continent of Europe to follow strictly the letter of the law in their respective countries, as it has always been the desire and policy of the Canadian Pacific Railway to conform without question to the wishes of the Governments of the countries in which these agents are permitted to do business.

In the case of Austria, the Canadian Pacific Railway, knowing the natural dislike of the Austrian Government to the heavy emigration over its frontiers, went out of its way to show the Austrians how they could control that emigration—namely, by concentrating the stream on the Austrian port of Trieste, where careful examination could be made of the emigrant's antecedents and papers. It was also recommended that Austrian Government inspectors should travel on all steamers from Trieste to ensure the proper treatment of Austrian subjects on the voyage, and to prevent the possibility of exploitation by undesirable.

Such examination and protection could not be effectively made under previous conditions, where emigrants could leave by so many different frontier stations, thereby making effective control impossible. The Canadian Pacific Railway obtained its concession for emigration business in Austria purely as a carry-

ing Company, and has strictly forbidden its agents to conduct or promote any propaganda whatever in favor of emigration, the tickets issued being almost entirely prepaid by friends and relatives who have settled in Canada or the United States, and who would, therefore, have left their native country in any case.

Passenger offices were established in Austria with the consent of the Austrian Government, and the Canadian Pacific agents were in each case approved of, and in some cases were even nominated both by the central authority in Vienna and by the local authorities in the respective provinces, the object being to prevent any possible abuse by irresponsible agents.

The line of steamers established by the Canadian Pacific Railway from Canada to Trieste was put on at the direct request of the Austrian Government in order that the merchandise business between Austria and Canada might be shipped direct from an Austrian port.

The carriage of Austrian subjects by all Canadian Pacific steamship lines this year have amounted to only 11,961, as against 14,000 in 1912. This is but a small percentage as compared to the carryings of the Continental Pool lines, which numbered 109,123 in 1911 and 201,294 in 1912.

AN INTERESTING BOILER REPAIR.

By J. H. W.

THE twin-screw steamship "Canada," 11,440 tons, of the Austro-American line, is one of the largest vessels entering Montreal harbor during the

present season. She is, moreover, one of the largest emigrant ships in the world, having accommodation for over 3,000 steerage passengers, together with a crew of 160.

The "Canada" is propelled by quadruple expansion engines fitted with Walschaert valve gear, and steam at 215 lbs. pressure is raised in four boilers of the Scotch type. Each of the latter has three furnaces, the two centre boilers being single-ended, while the port and starboard boilers are double-ended. On the ship's first voyage to Montreal from Trieste this season, she met with a mishap, which put the port boiler out of commission. She had a very light cargo on that trip, and was only drawing 13 feet forward and 21 feet aft, as against her normal draft of 30 feet when fully loaded.

The incident took place in the afternoon when off the Banks of Newfoundland. The "Canada" had on board 2,300 passengers, the majority of whom were on deck at the time. A strong north-easterly wind sprang up suddenly, and as there were numerous icebergs in the vicinity, this wind was very cold, causing the passengers to make a concerted rush to the lee side of the deck houses. This movement, combined with the strong wind, gave the vessel a bad list to port, with the result that the crown sheet of the starboard combustion chamber of the port boiler became overheated and collapsed.

There were three inches of water in the glass at the time, and directly the ship listed extra feed was given to all the boilers. At the same time the starboard tanks were filled as rapidly as pos-

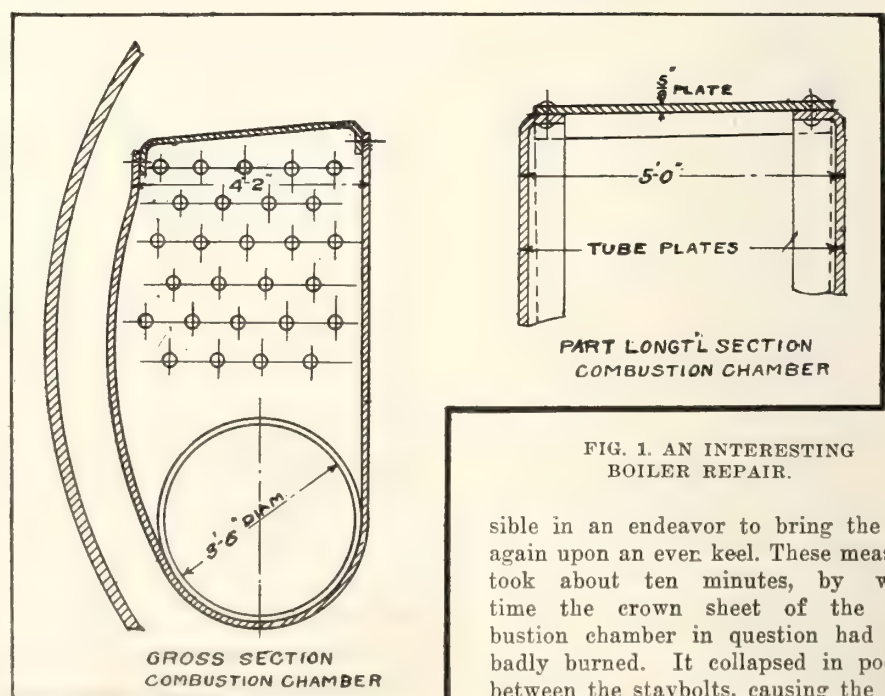


FIG. 1. AN INTERESTING BOILER REPAIR.

sible in an endeavor to bring the ship again upon an even keel. These measures took about ten minutes, by which time the crown sheet of the combustion chamber in question had been badly burned. It collapsed in pockets between the staybolts, causing the holes

for the latter to become enlarged, although the bolts did not actually pull out. There was, however, a serious leakage of steam and water into the furnaces.

The ashpan and uptake dampers were immediately closed, and the fires drawn. The latter operation proved rather a difficult one owing to the escaping steam; but fortunately no one received injury.

the same curvature. It was then transported from the Hall Engineering Works to the ship, where it easily passed through the furnace flue into the combustion chamber.

The next step was to raise the plate and place it upon the top of the forward tube sheet with the flanged edges in a fore and aft direction—that is, in a position at right angles to the direction

the risk of setting up serious stresses in the metal.

All that now remained to do was to turn the plate round into its final position and drill it for the rivet and stay bolt holes. The rivets were then driven, the girder stays replaced, and, in just a week's time from the commencement of

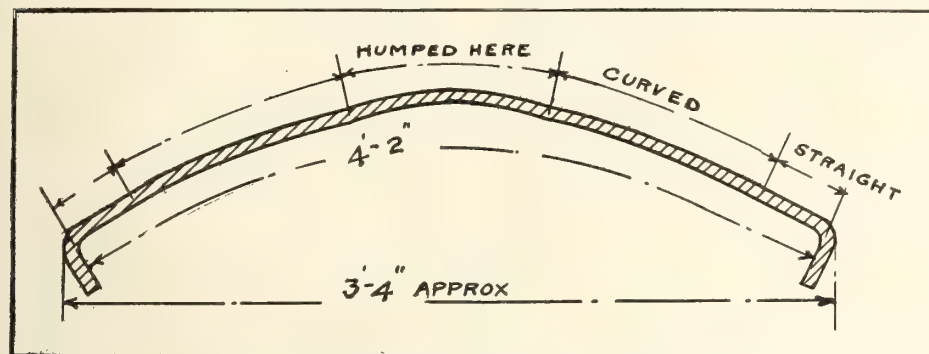


FIG. 2. AN INTERESTING BOILER REPAIR.

Making the Repair.

The voyage was continued with three boilers, and on Montreal being reached, repairs to the damaged combustion chamber were at once undertaken by the Hall Engineering Works of that city.

The combustion chamber top was 4 feet 2 inches wide by 5 feet long, and it was desired to have the new crown sheet made from a single plate, but the internal diameter of the corrugated furnaces was only 3 feet 6 inches; so that at first sight there seemed to be no choice but to use two plates and have a riveted joint along the top of the chamber. Such a joint would, of course have been highly undesirable in such a location, and the manner in which the necessity for it was overcome is shown in the accompanying cuts.

The crown sheet, it should be mentioned, was $\frac{5}{8}$ inch thick and of ordinary boiler plate quality—60,000 pounds tensile strength. It was flanged on two edges to make joint with the combustion chamber side sheets, as indicated in Fig. 1. In order to get it through the flue it was determined to roll it to a curve, as shown by Fig. 2. A piece of $\frac{1}{8}$ inch plate was first taken and cut to the dimensions of the crown sheet. This plate was then flanged, so that it formed a true templet of the heavier plate. It was then put through a set of rolls and various trial curves given to it until it would pass easily through the flue. The curve did not extend the full width of the plate, a portion of the latter being left flat near each of the two flanges. A rather sharper radius was given along the longitudinal centre line than elsewhere, the general shape of the curve being shown in Fig. 2.

The templet having been satisfactorily shaped, the crown sheet was rolled to

they were to eventually occupy. This is shown in Fig. 3.

Straightening the Plate.

The plate having been got into the position indicated, stout timber struts were fitted between it and the boiler shell. These served to hold it securely while one half was gradually straightened out by hydraulic jacks. When this had been satisfactorily accomplished the plate was removed to a similar position on top of the other tube sheet, and the straightening operation repeated on the other half. The plate was practically straightened cold, it only having had "the chill taken off," in order to avoid

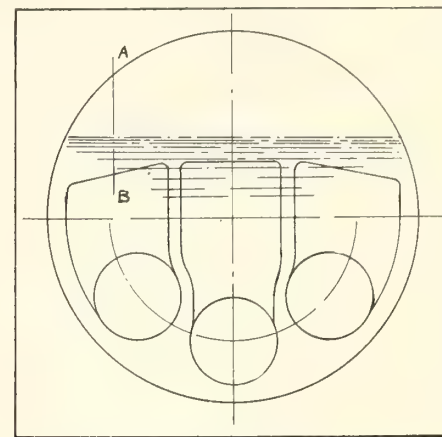


FIG. 4. AN INTERESTING BOILER REPAIR.

the job, the boiler was ready for steam again. Of course, work was carried on night and day; but, even so, the performance was a good one. Turning the plate around and afterwards straightening it were two very awkward operations in the cramped quarters afforded by the combustion chamber; and that the work was satisfactorily accomplished speaks well for the facilities to be found at the port of Montreal, and the resourcefulness displayed by and emergency equipment available at the Hall Engineering Works there.

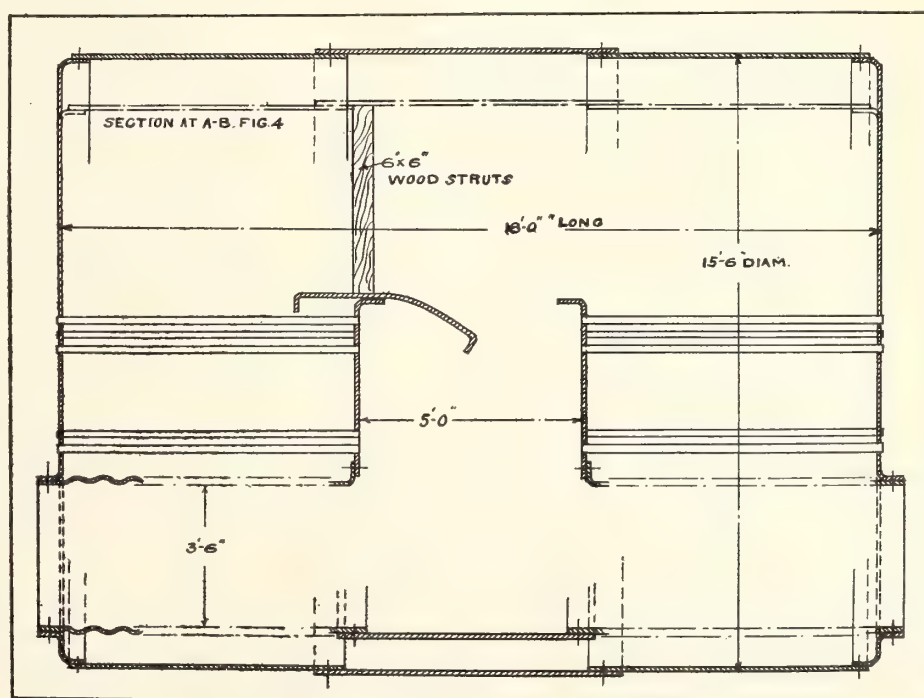


FIG. 3. AN INTERESTING BOILER REPAIR.

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OFFICES:

CANADA—
Montreal—Rooms 701-702 Eastern Townships Bank Building,
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Toronto—143-149 University Ave. Telephone Main 7324.

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THE EVILS OF PILOTS AND POLITICS.

IT was ironical that Pilot Adjutor Lachance, appointed by the Government one of a commission to investigate pilotage conditions on the St. Lawrence, should run the Lake Manitoba ashore on the Isle of Orleans, and conse-

quently be suspended. It was disgraceful that the Marine Department deemed it expedient to interfere with the ruling of the Wreck Commissioner, and reinstate him. Why was Lachance reinstated? Because the Department thought that a temporary suspension resulted in unfitting a pilot for his work. The Department argued that conditions in the St. Lawrence were liable to change, and that Pilot Lachance during his suspension might not be cognizant of additional aids to navigation and changes in the position of buoys.

If this be so, why suspend any pilot for carelessness when entrusted with the lives of passengers? Has not Pilot DeLisle, who stranded the New Zealand liner Whakatane in Indian Cove last month, the same right to reinstatement on this argument? A better punishment would be to suspend pilots when navigation closes, so that there would be no danger of them not being able to resume their duties when navigation opens.

It looks very much as though politics is again playing a part in the pilotage of the St. Lawrence. When the commission appointed to investigate this matter sat at Quebec last February, they learned some disgraceful things regarding the way political views acted. Alfred Laroche, superintendent of pilots at Quebec, said he lost his job through politics. The commander of the steamer for transferring pilots at Father Point said his crew were unable to man the lifeboats because they were farm hands, and had been put there by politics. Joseph Frenette, superintendent of Montreal pilots at Quebec, said he was a farmer, and had never been to sea in his life. It is safe to assume that he got this job through his politics.

The Commission referred to above was appointed by the Government owing to the stigma cast on the St. Lawrence by the stranding of many large liners in 1912 owing to the carelessness or incompetence of pilots. The year just past has shown no improvement. It is only necessary to cite the stranding of the Lake Manitoba on July 29, and of the Mount Temple in September, both of which were due to negligence.

The situation is humiliating, disgusting, and a menace to Canadian shipping. Under such conditions how can the insurance companies be expected to lower their rates on the St. Lawrence? It is incumbent on the Government to act quickly, wisely, and in a non-partisan manner with this situation. When the credit of the country, the lives of passengers, and the property of steamship companies are thus placed in jeopardy, it is time politics were thrown to the winds.

We are informed from Ottawa that Parliament will discuss this matter at its next session. It is reported that the Quebec Pilots Corporation will be abolished, and that a uniform system governing pilots all over the country will be substituted. This sounds good. The defect is there; it requires a remedy.



CONSOLATION FOR REFORMERS.

IN a letter to his sister, written in 1861, John Bright, then in the thick of his fight to get the Parliamentary franchise extended to workingmen, said:—

"Notwithstanding all the immeasurable ignorance and stupidity of the majority of the race, there is a gradual and sensible victory being gained over barbarism and wrong of every kind. I think we may in some sort console ourselves. If we can't win as fast as we wish, we know that our opponents in the long run can't win at all."

MARINE NEWS FROM EVERY SOURCE

Coquitlam, B.C.—The Coquitlam Shipbuilding Co. are building a \$21,000 snagboat to replace the Samson.

Louisburg, N.S.—The British barque Gesdiana went ashore at Gooseberry Cove, Oct. 14. She was a total loss. The crew were saved.

Quebec, Que.—Messrs. M. P. and J. T. Davis, contractors for the new drydock at Levis, have signed the contract, and are now waiting for the Government engineer to lay out the work.

Vancouver, B.C.—The president of the White Pass and Yukon Railway announces a direct steamship service from Vancouver to Skagway, utilizing steamers costing \$1,000,000.

Welland, Ont.—The Reid Wrecking Co. were given the contract to raise the steamer Lloyd S. Porter, which sank in the canal on Oct. 13. After being raised, she proceeded to Belleville.

The Dredge Port Nelson, built at the Polson Iron Works, Ltd., Toronto, for work in connection with the terminal for the Hudson Bay Ry., reached Port Nelson safely early in October.

Halifax, N.S.—The Allan Line will occupy the north side of Pier 2, and the north and south sides of Pier 3, as berths for the new liners Alsatian and Calgarian. The C.P.R. Empresses will also use the same berths.

Winnipeg, Man.—Winnipeg and St. Boniface harbor commissioners decided at a meeting held October 8 to ask the Dominion Government for \$100,000 to build docks along the Red River. T. R. Veligny, Government engineer, will make a report on the actual cost of the work.

Midland, Ont.—The C. P. R. liner Athabasca struck the cement abutments at the Soo on her down trip Sept. 29, and stove a large hole in her bow, above the water line. She was repaired at the plant of the Midland Dry-dock Co.

St. Lawrence Channel.—It is announced by the Marine Department that the work in the channel through the Traverse below Quebec has been completed. The result is a widening of 250 feet and a 30-foot depth at extreme low water. The completion of this work marks the

disappearance of one of the few remaining difficulties to be met with in the St. Lawrence ship channel.

Leamington.—The City of London, a large American wooden freighter, and the Joe S. Morrow, a large steel steamer, collided off Point Pelee, Sept. 30, in a thick fog. The London struck the Joe S. Morrow amidships and tore a tremendous hole in her side.

Elevator at Port Nelson.—The Trade and Commerce Department has called tenders, to be in by November 5, for the big grain elevator to be erected at Port Nelson, on Hudson Bay. The elevator is to have a capacity of a million and a half bushels.

Welland, Ont.—The contract for the lighting and the power used on the Welland Canal has been given again to the Lincoln Light and Power Co., by the Dominion Government. The renewed contract is to run a number of years, at the same figure as before.

The Canadian Government has signed a contract with the Royal Mail Steam Packet Co. for a Canadian service between the Maritime Provinces and the British West Indies. The service will commence in November, the vessels being the Chapleur, Cobequid, Chignecto and the Chedebucto.

Esquimalt, B.C.—The B. C. Marine Railway Co. have been given the contract to install oil burners in the boilers of the Dominion dredge King Edward. The King Edward is the second Government vessel to be so fitted within the last few weeks, the Fruhling having recently returned from Vancouver after having undergone the same alterations.

Welland Canal Contract.—The contract for section two of the new Welland Canal will, it is expected, be awarded at the next meeting of the Cabinet Council. It is understood the contract will go to Bouldry, Yerburg & Hutchinson, a well-known British firm with a Canadian branch now established at St. Catharines. Their tender was the lowest of the half dozen submitted. The amount of the contract is approximately five and one-half million dollars. The firm is ready to start at once on the

work. The plans for section two call for the removal of about 6,500,000 cubic yards of material.

Vancouver, B.C.—Yarrow's, the British marine engineers, are contemplating erecting works at Esquimalt, B.C., or at Vancouver, and perhaps in the Maritime Provinces. Mr. Yarrow is on his way to Canada.

Montreal, Que.—The Canadian Vickers Co., Limited, has awarded the McArthur Concrete Pile and Foundation Co., New York, the contract for the foundations of the new shipbuilding plant. About 750 pedestal concrete piles will compose the foundation.

Merchants Mutual Lake Line, Ltd., incorporated at Ottawa; capital \$1,500,000, to construct and operate ships, and generally to carry on the business of a shipbuilding, engineering, elevator business, at Toronto. Incorporators: James S. Lovell, Charles D. Magee, etc., Toronto.

Fort William, Ont.—Negotiations for the sale of C.P.R. elevators "A" and "C" to the James Richardson Co. were reported on October 3. The elevators have a capacity of 1,100,000 bushels, and are situated on the Kaministiquia River. It is said that the Company is not willing to sell the land, but will give a lease of it for a long term.

Port Arthur, Ont.—To get ready to break the ice in the harbor during the winter, the steamer St. Ignace is undergoing a general overhauling in the dry dock. With the Whalen and the Horne this will make three ice breakers working next winter. The St. Ignace was a car ferry running between Mackinaw City until she was bought by the Great Lakes Dredging Co.

C.N.R. Pacific Coast Service.—The Canadian Northern Railway Co. is reported to be planning the establishment of a fast steamship passenger service between Port Mann, Vancouver and San Francisco, probably including calls at Victoria, and has placed an order with the Fairfield Shipbuilding and Engineering Co., Glasgow, for two 20-knot steamers, to be known as the Duke of Connaught and Duke Clarence respectively.

Welland, Ont.—Chief Engineer Well-er, of the new Welland ship canal, has received word from the Dominion Dredging Co., who have the contract for building the new harbor, breakwater and pier at the canal entrance, Lake Ontario end, that they are bringing their entire fleet of dredges down the lake and will make an early start on the work.

Canada Steamship Lines, Limited, is the name of the new company which will take over the Richelieu & Ontario Navigation Co., and the other companies taken over by the "Canada Transportation Lines, Limited." Apparently the title, "Canada Transportation Lines, Limited," was not liked by some of the directors, and it was decided to adopt the more descriptive title of "Canada Steamship Lines, Limited."

Panama Canal.—The first lockage at the Pacific end of the canal occurred on Oct. 14, when the tug *Miraflores*, three barges, and two other craft were raised together through the west flight of the *Miraflores* locks from the Pacific entrance of the channel to the surface of the *Miraflores* Lakes, 36.82 feet above the sea level. The lockage was made without a hitch, all the machinery working with the same precision as obtained in a similar operation at Gatun Locks recently.

Goderich, Ont.—What is acknowledged by marine captains as the best single leg record on the Great Lakes was made by the "Transit" elevator on October 1, in unloading the steamer *J. A. McKee*. The cargo consisted of 85,000 bushels of wheat and 45,000 bushels of oats, the equivalent of 120,000 bushels of wheat, and was taken out in eight and one-quarter hours from commencement until the steamer left the dock, an average of over 14,500 bushels of wheat per hour.

Diesel Engine Factory on the Clyde.—A new Diesel engine manufactory, it appears, is to be laid down on the Clyde, the *Fairfield Co.* and *John Brown & Co.* being interested. With this new factory there will be three works in Glasgow devoted solely to the building of Diesel engines. Work is being pushed ahead on the new factory of the *North British Diesel Co.*, at *Jordanvale*. It will, however, be a year or eighteen months before the shops are ready to execute work.

C.P.R. Pacific Liners.—According to rumor, the C.P.R. liners *Empress of India* and *Empress of Japan* will probably be withdrawn from the trans-Pacific service early in January. This will leave the new liners, *Empress of Asia* and *Empress of Russia*, together with the intermediate steamer *Monteagle*, maintaining a monthly service on the route. The *Empress of India* and *Em-*

press of Japan will, it is thought, be overhauled for the run from *Victoria* to *San Francisco*.

New Canadian Service.—The *Cunard* Company will, on January 1 next, inaugurate a new service between *Liverpool* and *Canada*, in which service their two new vessels, the "*Andania*" and "*Alaunia*" with the "*Ivernia*" are to be employed. The *Southampton-Canadian* service of the Company will be maintained by the "*Ausonia*" and "*Ascania*" until other vessels are available. The steamers in both these services will call at *Queenstown* for *Irish* traffic.

PILOT LACHANCE REINSTATED.

FOR the first time in many years, the Marine Department has deemed it expedient to interfere with the Board of Wreck Commissioners, and it is announced that the pilot, *Adjutor Lachance*, President of the *Pilots' Corporation*, *Quebec*, who had his license suspended from August 14, 1913, until the completion of the present season of navigation, will be reinstated immediately by order of the Marine Department.

It will be remembered that *Pilot Lachance* was in charge of the C.P.R. boat *Lake Manitoba*, which stranded on the *Isle of Orleans*, near *Quebec*, on July 29. An investigation was held by the Board of Wreck Commissioners in *Montreal*, with *Captain Lindsay* as Chairman and *Captains Nash* and *Mitchell* as the other members of the Board. As a result of the investigation, the license of *Pilot Lachance* was suspended until the completion of the season of navigation.

In reinstating *Pilot Lachance*, the Department takes the position that having regard to the extreme importance of efficient pilotage on the *St. Lawrence* a temporary suspension, as in the present case, results in unfitting a pilot for work when the license is restored. The Department argues that conditions in the river are liable to change, also that additional aids to navigation and changes in the position of buoys are not uncommon. As a result, a pilot who is under temporary suspension would not have a knowledge of these changes when he resumed his calling.

The Department feels that its action is in keeping with the spirit of the framers of the Act governing pilotage, which prescribes the imposition of a fine so as to render unnecessary the temporary withdrawal of a pilot from his work. The Department believes that the reinstatement of *Pilot Lachance* is more in the interests of an efficient pilotage service than to continue the suspension until the end of the period designated by the court. It is understood that the Department would have been very re-

luctant to have interfered with a ruling of the court upon an offence of so grave a character as would have warranted permanent suspension.

PILOT SEVERELY CENSURED.

THE following is the finding of the court in the formal investigation of the C.P.R. liner "*Mount Temple*," in *Montreal Harbor* on September 24.

"The court, after carefully considering the evidence, is unanimous in its opinion that the cause of the stranding was entirely due to an error of judgment on the part of *Louis Z. Bouille*, the pilot, inasmuch as he did not alter his course to port, knowing as he did that the vessel was slow in answering her helm, and bring buoy No. 177M., on his starboard bow before getting abreast of buoy No. 181M., which buoy was, in the opinion of the court, passed too close for safe navigation under the circumstances, taking into consideration the speed of the ship which was then 15 knots, and the close proximity of the bank to starboard, upon which the vessel struck."

"The court, therefore, severely censures the pilot, *Louis Z. Bouille*. No blame is, in the opinion of the court, attached to the master or officers of the vessel but it considers that the manner in which the entries are written in the engineer's log-book are open to criticism."

"With regard to the positions of buoys No. 191M. and No. 193M., which were found to be incorrect, the court does not consider that this fact had any bearing on the stranding, as under the circumstances it is of opinion that the pilot having buoy No. 181M. almost alongside the ship, and buoy No. 177M. in plain sight ahead, had no reason to depend upon buoys to the westward to assist him in keeping his vessel in the channel."

The inquiry was held at *Montreal* on October 1 and 8, before *Commander Henry St. George Lindsay*, R.N.R., *Dominion Wreck Commissioner*, assisted by *Captains Francis Nash*, *John Mitchell*, and *Joseph Ostens Grey*, acting as assessors.

According to the evidence, the *Mount Temple* left her berth at *Shed No. 7*, at 5.30 o'clock, under the direction of *Louis Z. Bouille*, a licensed pilot for the district of *Montreal*. The weather appeared fine and clear, and at 5.42 the engines were ordered full speed ahead. Owing to the fact that the range lights astern were obscured by smoke from factories, etc., in the city, the ship was being steered by the buoys marking the south side of the channel, Buoy No. 181M. at a distance of about 70 feet. Upon her entering dry dock, the vessel's bottom was found to be severely damaged.

Notable Personalities of Canada's Merchant Marine

The part that shipbuilding, marine engineering and shipping companies have played in bringing Canada prominently before the eyes of the civilized world, has not, we believe, received that credit of performance which is its due. We hope in this series dealing with "notable personalities of Canada's Merchant Marine," to show that those who have bridged the trackless ocean to our shores, and provided the facilities for our disembarkation, are worthy of at least a sentimental regard.

MANAGER-IN-CHIEF, C. P. R. OCEAN SERVICES.

THE recent announcement by the President of the Canadian Pacific Railway Co. of the appointment of Mr. H. Maitland Kersey, D.S.O., as manager-in-chief of the ocean services of the Company on the Atlantic and Pacific, puts aside a number of rumors which have been current in shipbuilding circles for some time. It is of further interest because Major H. Maitland Kersey is a director of Allan Bros. & Co. (U.K.), Ltd., and of the Allan Line Steamship Co., Ltd. These historic and progressive shipping firms have for some time past worked on an extremely friendly relationship with the C.P.R., and it is almost needless to suggest that the appointment of Major Maitland Kersey will further enhance that relationship.

His association with Atlantic shipping is a distinguished and a lengthy one. Many years ago, he was the representative in Vancouver for the Canadian Pacific Railway Co., and when the order was given for the building of the three liners, Empress of China, Empress of India, and Empress of Japan, Mr. Kersey went over to England to superintend their construction. The three steamers were for the Trans-Pacific service between Vancouver, Japan and China.

This was in the year 1890 and 1891, and, being one of the leading representatives of the C.P.R. Co. at that time, he was brought into association with the principals and officials of other large steamship lines, and, therefore, very little surprise was felt at the announcement made a little later that Mr. Kersey had been appointed the New York agent for the White Star Line.

White Star Line Appointment.

This change was occasioned when Mr. Bruce Ismay retired from the position of agent for the White Star Line at New York to come to Liverpool to become a partner. Mr. Bruce Ismay's business acumen, keen insight, and remarkable organizing powers had left its impress upon the New York agency, and it required an exceptionally competent person to follow him in the position, and in Mr. Kersey the Company found a

very worthy successor to Mr. Bruce Ismay, although the business at New York at that time was nothing like it is at the present.

Mr. Kersey held the appointment for some years with distinction to himself and immense advantage to the Company, and on his departure from New York the expressions of regret took a very practical form. From New York he went to the West Coast of North America, where he was associated with a private enterprise in Yukon. His next change was from those distant western outposts to London, England, where he became identified with a London bank-



H. MAITLAND KERSEY, D.S.O.

ing firm, also becoming a London director of the Allan Line.

His early associations with the C.P.R. enabled him to gain valuable knowledge as to the internal workings of that huge concern, for in addition to having the supervision of the building of the three Pacific "Empress" liners, and holding the Vancouver agency of the line, he also assisted in the negotiations with the British Government for the arrangement of the subsidy for their mail steamers. This knowledge will now prove very valuable to him in the new position to which he has been

appointed as manager-in-chief of the C.P.R. trans-Atlantic and trans-Pacific lines.



NEW C.P.R. LINERS.

NEXT season will see the Atlantic service of the C.P.R. augmented by the addition of two new steamers, which will make St. John their winter port of call. These two vessels will be of the one class cabin type, which are becoming so popular. Barclay Curle & Co., of Glasgow, secured the contract for the building of the ships some months ago, and the construction is well under way.

They are being specially built for the Atlantic service, and will contain every possible convenience for the comfort of passengers. Their length will be 520 feet, greatest breadth 64 feet, while the breadth of the passenger deck will be 41 feet. Each vessel will have capacity for 520 second-class passengers and 1,200 third-class, while the dead weight capacity will be 7,950 tons, with an approximate cargo capacity of 6,000 tons. The famous cruiser stern, which is the feature of the new Empress recently placed on the Pacific coast, is being introduced. The speed of each vessel will be 15 knots, on a mean draught of 27.5 feet.

As for the interior of the vessels, each second-class state room will be fitted with a wardrobe and chest of drawers, folding lavatory with mirror, and other conveniences. The public rooms will consist of a dining saloon, smoking room, lounge and drawing room. The refrigerating plant will be capable of making 300 lbs. of ice per eight hours, and the vessel will be heated and ventilated on the thermotank system, with eight changes of air each hour.



New Canadian Liners.—Harland & Wolff, of Belfast, have received orders from the White Star Line for two new vessels for the Canadian service, each 590 ft. long, and with a gross tonnage of about 16,000. The vessels will, therefore, be 25 ft. longer and about 1,500 tons heavier than the Laurentie, which at present is the largest vessel owned by the White Star Co. on that particular service.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Captain Wallace W. Crosby, of Brooklyn, N.S., died Oct. 9, aged 72. He commanded vessels owned in Yarmouth, N.S., and St. John, N.B.

Capt. W. Stewart, formerly commander of the Empress of Britain, whose experience in navigating the St. Lawrence extending over nearly fifty years, died near Liverpool on October 14.

Thomas Vickers, Owen Sound, Ont., who has been Government inspector on the harbor improvement work being done in Owen Sound, died on September 25, aged 54.

Captain Joe Goodwin, skipper of the vessel of that name, chartered by the city of Toronto as a fire tug, tendered his resignation to the Board of Control on Oct. 21, pleading ill-health.

Collingwood Smith, the young son of the general manager of the Collingwood Shipbuilding Co., performed the christening ceremony of a Government dredge launched recently at Collingwood.

Sir Stephen Furness, head of the Furness line, arrived in Montreal, October 14th. He stated that three new ships of the ordinary freight type would be put on the Canadian route next year.

H. B. Ames, member of Parliament for the St. Antoine Division of Montreal, has been visiting the naval shipbuilding yards throughout Great Britain on behalf of the Dominion Government.

A. Junkens, vice-president of the Westinghouse, Church, Kerr Co., who were awarded the contract for erecting the C.P.R. depot and docks at Vancouver, recently inspected the work being done.

O. Gendron, chief engineer of the R. & O. steamer "Montreal," has been appointed head of the Montreal Harbor Commissioners' dredging fleet, in suc-

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William Street, Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy Street, Kingston, Ont.; Capt. James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

cession to the late Captain Yale. The appointment dates from November 1.

J. Forster, C.P.R. agent at Liverpool, and a brother of Captain Forster, who has just relinquished command of the Empress of Ireland, died Oct. 7. Another brother, George H. Forster, lives in Montreal.

Capt. J. R. Garlock dropped dead in the arms of his son aboard the barge Mary Burke, near Sarnia, Ont., on Oct. 21. He was sixty-three years old, and commanded the Burke, which has been carrying coal for the Imperial Oil Co. this season. Death was due to heart failure.

Capt. Thos. V. Jennings, Toronto, died Oct. 17. He was born in Port Credit, Ont., and when about sixteen or seventeen years old, he commenced his life as a sailor on the Great Lakes, working himself up to the position of captain. Twenty-four years ago he enlisted with the Toronto Ferry Co. as a captain, and previous to his last illness he was in charge of the "Primrose." Years ago he captained the Watertown which ran from the Humber.

Dr. William Wakeman, of Gaspe, Que., commanding officer of the fisheries patrol boat Princess, and inspector of fisheries for districts embracing treaty waters, has been nominated by the Canadian Government under the terms of an agreement of July 10, 1912, between Great Britain and the United States, regarding regulation of bays, following the decision of the Hague Tribunal of September 7, 1910, as their representative on the commission to be known as the Permanent Mixed Fisheries Commission.

To Vote on Wireless Equipment.—The Executive Council of the National Sailors and Firemen's Union at an em-

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.
President—James Playfair, Midland; Counsel—F. King, Kingston, Ont.

GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.
Chairman—W. F. Wasley, Gravenhurst, Ont.
Secretary—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.
President—A. A. Heard, Albany, N.Y.
Secretary—M. R. Nelson, New York. . . .

THE SHIPPING FEDERATION OF CANADA
President—A. A. Allan, Montreal; Manager and Secretary—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.
Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; Grand Secretary-Treasurer—Capt. H. O. Jackson, 376 Huron St., Toronto.

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Jno. A. Murphy, Midland, Ont., Grand Conductor.
George Bourret, Sorel, P.Q., Grand Door-keeper.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto.	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John.	2	H. E. Berry,		G. T. G. Blewett,	36 Murray Street, St. John, N.B.
Collingwood.	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood.
Kingston.	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal.	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria.	6	Alex. McNivern,	P. O. Box 234,	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver.	7	Andrew T. Roy,	1212 Burrard St.,	E. Read,	859 Thurlow St.
Levis.	8	Helaire Mercier,	3 St. Joseph St.	S. G. Guenard,	Lauson, Levis, P.Q.
Sorel.	9	Geo. Gendron,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound.	10	W. Robertson,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor.	11	Alex. McDonald,	28 Crawford Ave,	Nell Maitland,	221 London St. W., Windsor, Ont.
Midland.	12	Jos. Silverthorne,		Jno. A. Murphy,	Midland, Ont.
Halifax.	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault S. Marie.	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown.	15	J. F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottet'n, P.E.I.
Twin City.	16	Arthur Abbey	Fort William, Ont.	John A. Smith,	Fort William, Ont.

ergency meeting held in London, England, on Oct. 14., decided to take a ballot of the members of the union on the question whether they were prepared to refuse after May 1, 1914, to ship on board any ocean-going craft not equipped with wireless telegraphy. The council expressed the opinion that much loss of life on cargo boats could be avoided if they were equipped with wireless telegraphy, which could be done at a cost of \$2,000 a year for each vessel. The council proposes to invite the seamen of other nations to join the movement.

HOPPER BOTTOM VESSEL.

THE steamer Calcite arrived at Port Colborne, Ont., on September 22, with a cargo of crushed limestone for fluxing iron for the Canadian Furnace Co. This is a hopper bottom steamship, equipped with steel pan conveyors which convey the cargo after it is dropped through the bottom of the hopper to a point in the forward end of the ship, when it is discharged into a steel elevator, which elevator in turn discharges it out on a belt conveyor, which is operated on a boom. The boom can be elevated to any desired angle and swung out over dock or over cars, as in the

present case. The cars are being loaded at the rate of 1,000 tons an hour. Several cargoes more of this limestone will be brought to Port Colborne this fall for the Canadian Furnace Co.

PORT OF MONTREAL REVENUE.

THE customs returns for the month of September, show a decrease of \$84,473.60, as compared with September 1912, the receipts for the past month being \$2,133,696.61 as against \$2,218,170.21 for the corresponding month of last year. Customs showed a decrease during August of over \$49,000, the first decrease to be recorded for the season. The September decrease would have been much worse but for the heavy payments made on the last day of the month. They amounted to considerably over \$100,000.

Curiously enough, while the customs returns showed such a marked decrease the inland revenue returns for the district of Montreal showed a still greater increase, the surplus received over September last year amounting to \$96,605.57. The receipts for the past month, which will be supplemented by some further small amounts from Valleyfield and elsewhere, amounted to \$925,029.83, as compared with \$828,424.26 for September 1912. During August the in-

land revenue returns decreased by nearly \$38,000, so the increase for September is the more remarkable.

The Department of Marine and Fisheries, Ottawa, have published a list of lights and fog signals on the inland waters of the Dominion.

The Department of Marine and Fisheries, Ottawa, have published a list of lights and fog signals on the Atlantic Coast, including the Gulf of St. Lawrence to head of ocean navigation.

Rule of the Road Manual by Capt. J. Netherclift Jutsum, F.R.A.S., 98 pages, treats exclusively and completely on all illustrations and charts, published by James Brown and Son, Glasgow, price 25 cents. This is a new edition of a very useful and interesting manual. It that appertains to the "Rule of the Road at Sea." A full-text reprint of the official "Regulations for the Prevention of Collision at Sea" is given, together with nine colored diagrams, illustrating all contingencies for sailing ships. There is also a carefully arranged series of questions and answers. The book contains data covering the angles of visibility of sidelights, signals, buoys, beacons, chart abbreviations, etc., and will be found very useful to those interested or engaged in the navigation of ships.

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At first sight there appears no particular reason why these men should be better acquainted with any particular subject than we ourselves are. They may have had no advantage over us in the matter of education. They have probably not travelled any more than we have, and as far as we can see there is no reason why we should look to them for information on diverse subjects rather than to any other of our acquaintances.

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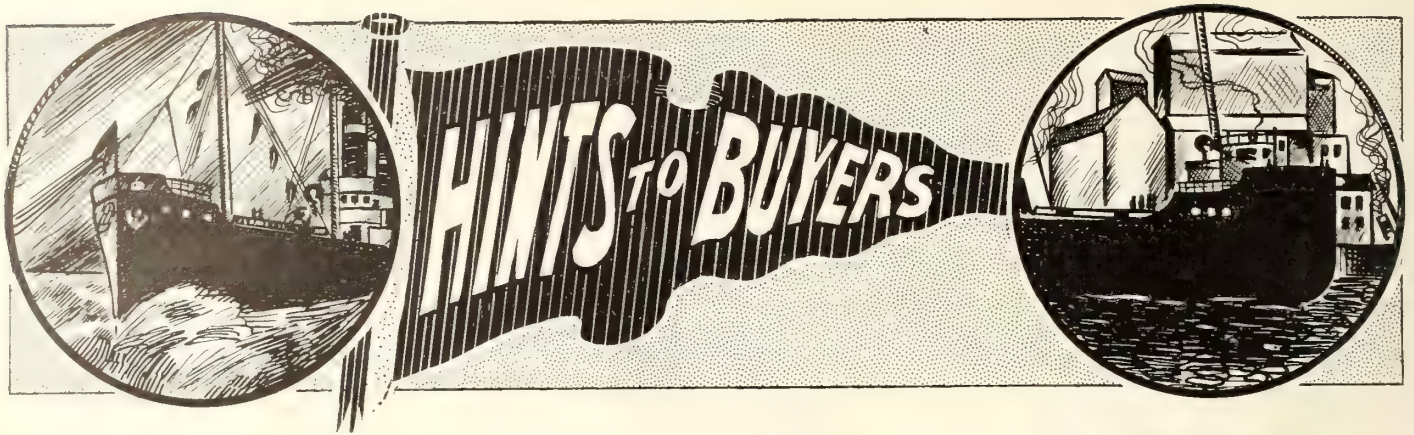
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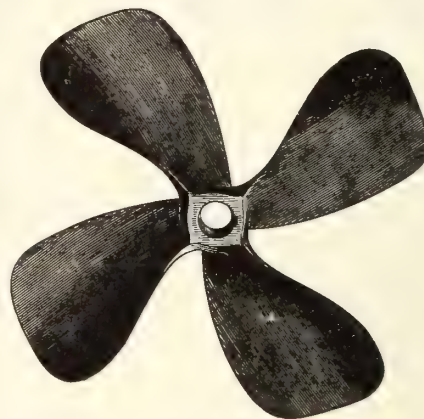
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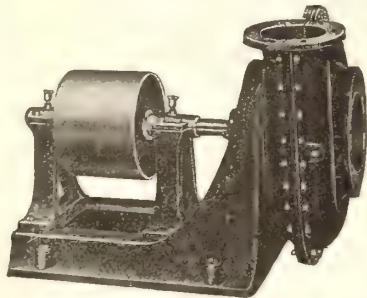
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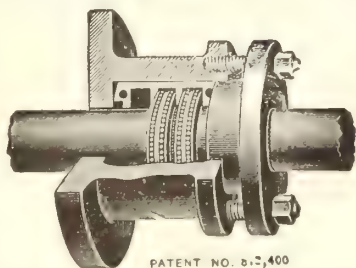
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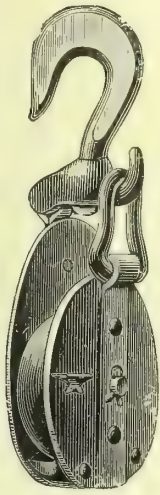
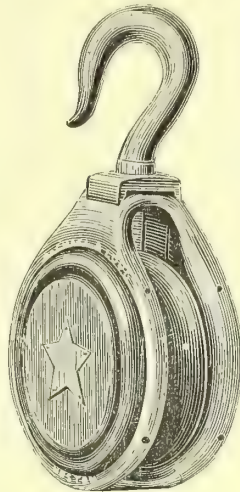
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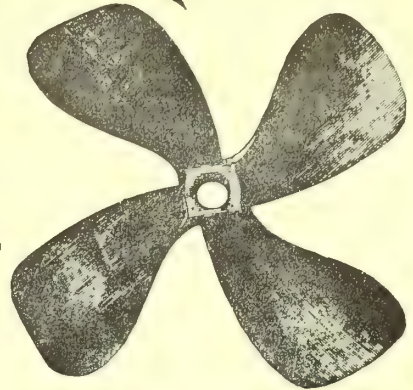


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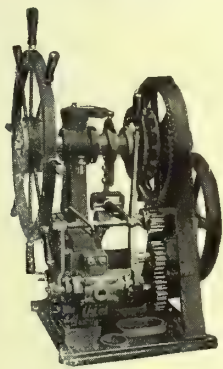


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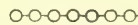
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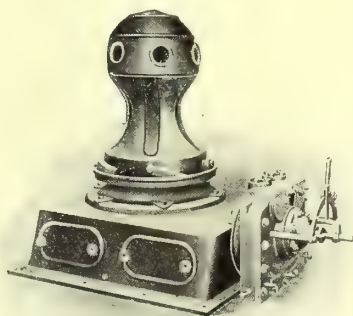


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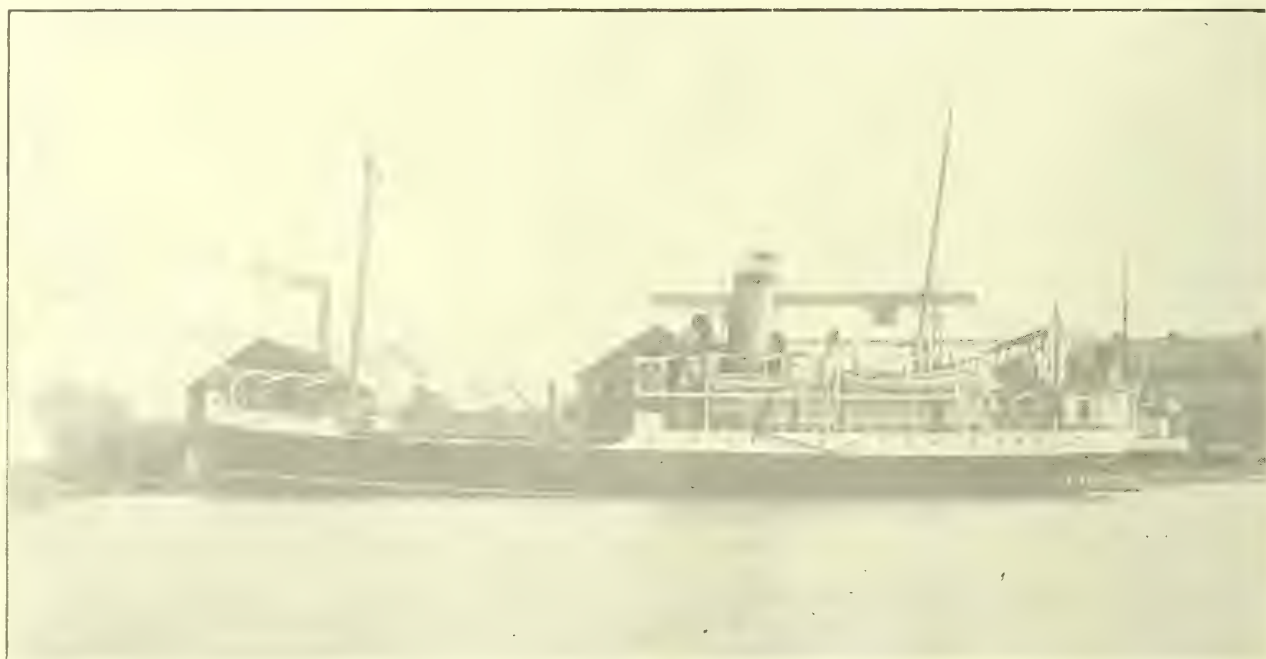
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A monthly journal dealing with the progress and development of Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks, and containing a record of the latest and best practice throughout the Sea-going World. Published by
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Publication Office, Toronto—November, 1913

No. 11



Dredge "Port Nelson" Built by Polson Iron Works Limited, of Toronto

Order placed by Department of Railways and Canals, Dominion Government on the 1st day of April, 1913. Dredge reached Port Nelson after voyage of 3500 miles on the 27th of September.



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GEO. D. PERRY, General Manager.
Telephone Main 5420.

Z. A. LASH, President.
RECEIVED AT Main Office, Scott and Wellington Streets, Toronto, Ont.

B2Mo.O.C. 37 Collect
Halifax NS Oct 13th 13
Col Miller

Polson Iron Works Limited, TORONTO ONT.

Dredge portnelson in spite of many difficulties encountered enroute arrived safely on Saturday twenty seventh time of passage sydney bar to portnelson bar twenty days six hours. Dredge behaved splendidly throughout voyage congratulate you on output.

H.B.Saunders

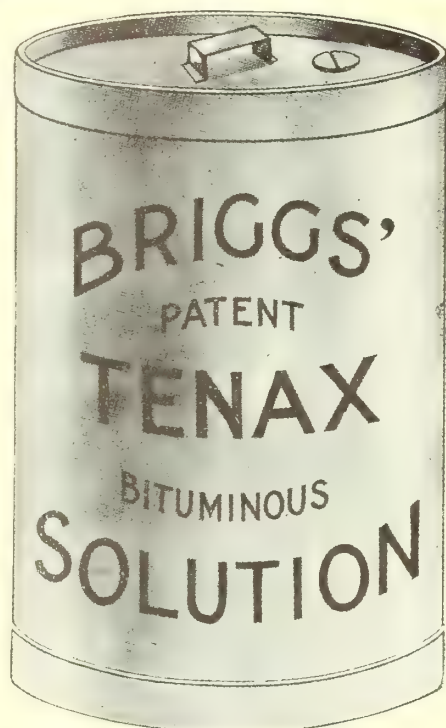
1010am

213

Telegram sent by Captain Saunders, the well-known marine surveyor and wrecking master, who was placed by the Department in full charge of towing of dredge to Port Nelson.

THE SOLUTION of the Corrosion Problem

The World's Record Anti-Corrosive.

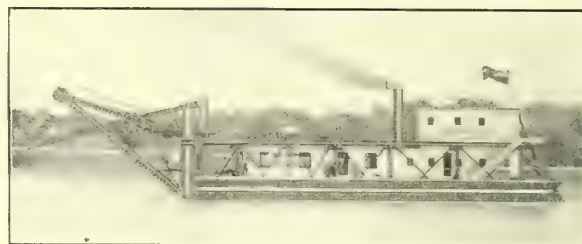


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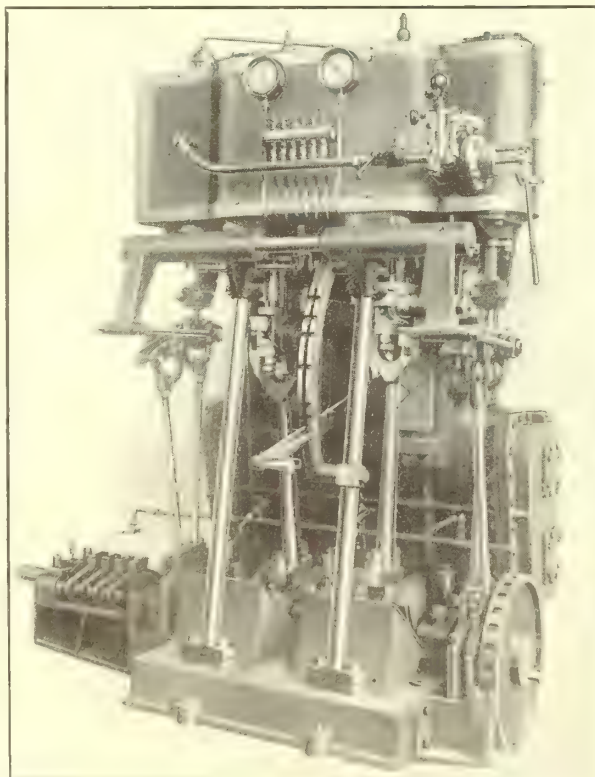
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CANADA

Why The Advertiser Succeeds.

¶ Why is it that during the last few months, when money was admittedly tight, the manufacturers who advertised the most felt the pinch the least?

¶ And how is it that now, when the circulation of money is less restricted, the manufacturers who felt the pinch the most will be the last to experience relaxation and relief?

¶ The same wisdom and foresight which prompts a manufacturer to advertise will naturally guide him in forming his whole selling and general business policy, and, like a good general, he is prepared for every contingency and emergency.

¶ The fact that the successful business man is an advertiser is usually incidental. He is an advertiser because he is wise and possessed of good sound business sense and an analytical mind. At some time or other he came to the conclusion that advertising could be made one of the mightiest factors of his business organization, and having arrived at this conclusion, he just naturally went to it and advertised.

¶ He had faith in his product, and his own faith manifested in a public way, inspired confidence in the minds of his prospective customers. His name and his manufactured product became synonymous with good service and satisfying quality. The public became acquainted with the merits of his line and familiar with its outstanding features.

¶ Consequently, when conditions were normal, he secured a liberal share of business and received first consideration when purchases were made.

¶ When money tightened and business was curtailed, he continued to get the lion's share of what was going. When purchases were carefully considered the advertised line received first attention and usually secured the order.

¶ And now that the financial tide is coming back, the advertiser is getting the biggest slice of the business melon, simply because during those cloudy days of curtailment, his advertising message had been studied and absorbed at a time when the public mind was most receptive.

¶ It pays to advertise if your line is good, and it pays to buy advertised lines, because they are invariably satisfactory. The general public have long been educated to believe that advertised goods are best. Can't you see that you are laboring, not only under a handicap, but under a cloud, if your product is not advertised? Publicity dispels the cloud of suspicion and removes the handicap.

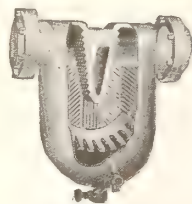
¶ You'd better hop on to the band wagon right away. Hopping on now, when the prospects for big business are so bright, will be not only timely, but extremely profitable.

Rate Card and full information gladly furnished.

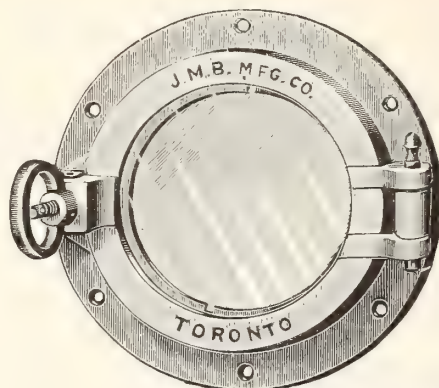
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A monthly journal dealing with the progress and development of the Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks etc.

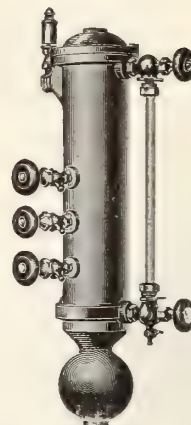
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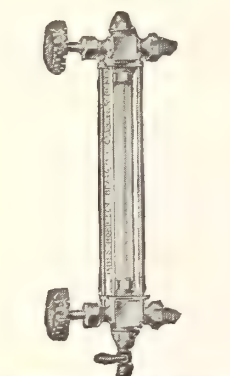
Every line we sell has proven its
merit by actual service, and is fully
guaranteed.

May we have the opportunity of
giving you full particulars in the line
or lines in which you are interested?

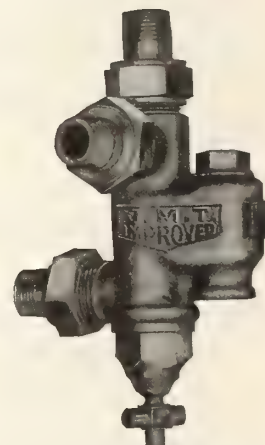
Write!

**The James Morrison
Brass Mfg. Co., Ltd.**

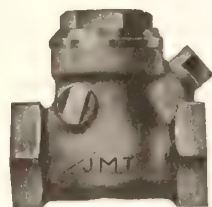
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Marine Folding Lavatory.



J.M.T. Globe Valve
Renewable Disc

The advertiser would like to know where you saw his advertisement—tell him.

Canadian Vickers Limited Shipbuilding Plant at Montreal

"By Maisonneuve"

A perusal of the accompanying article cannot fail to impress the reader with the far-reaching nature of the plans made to establish in our Canadian Metropolis a merchant and naval shipbuilding and marine engineering plant, and while the development towards surpassing the achievement aimed at, will of necessity be a matter of years, there is unmistakable indication that climatic and labor difficulties, which meantime have to be combated, will ultimately be overcome.

AN inspection of the new Canadian Naval Works at Maisonneuve on the Banks of the St. Lawrence at Montreal presents to the eye an instructive spectacle and to the mind subject for inspiring reflection. We have time and again been asked to believe, against our better judgment, that the building of warships in Canada is an economical, if not physical, impossibility. The works, which are developing into material form, contradict all such prognostications, and reflection on the significance of the addition of such an establishment to Canadian resources opens up a vista of potentialities too vast to be accurately measured.

Stability of the Enterprise.

The project materializing is not the conception of an inexperienced speculative mind, but is the embodiment of

apart altogether from their contributions in armour, ordnance and propelling machinery for other battleships—and of a great variety of smaller warships. Their support and guarantee of the immense establishment now being created on the St. Lawrence must, therefore, rule out of court all predictions as to the difficulty of achieving complete success in the building of warships and merchantmen in the Dominion.

The Economic Feature.

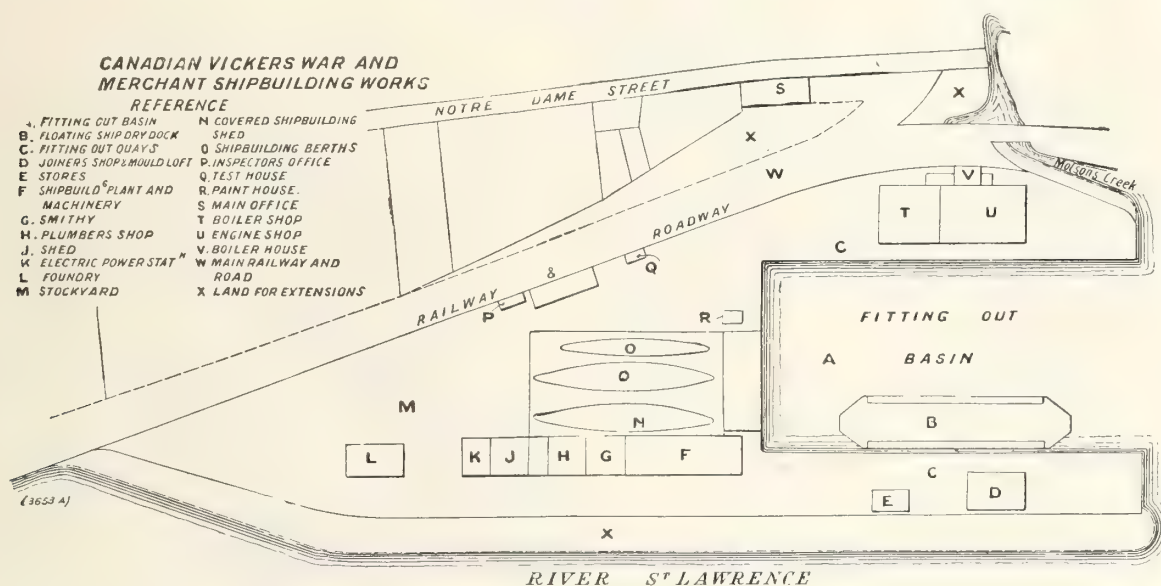
The conditions in Canada, are no more severe than, for instance, those obtaining in Russia, where for years satisfactory work has been done. As regards industrial economics, again Canada is not worse off, and perhaps we are better off than our neighbors, the United States, where the enormous advances made in the development of mechanical

the results will be eminently satisfactory from this standpoint.

The Canadian Navy Feature.

There is no question that before many years have passed, Canada will produce warships as well as commercial ships, equal to those of any other nation, to take their place in the fleets of the world, and to give as good a report of themselves as the ships of the oldest and most prosperous of commercial countries. All in the Dominion recognize the need for defence. Most of us are convinced too, that Canadian ships should ever be at the call of the Homeland in her hour of need, while no one will fail to agree to assist in the maintenance of the Imperial Navy.

There is, at the same time, however, a great and justifiable ambition to create an industry in Canada for the build-



great and ripe experience. In their estimate of the possibilities of the project, in the arrangement and equipment of the works, and in the design, construction and completion for service of ships to be built in the establishment, the projectors have the co-operation and technical assistance of the greatest naval firm in Great Britain that of Vickers Limited.

In the past five or six years, the Vickers Company have been responsible for the construction of thirteen of the world's largest "Dreadnoughts"—

appliances for economizing labor have robbed the bugbear of "high rate of wage" of much of its significance.

It is more and more being recognized that a high rate of wage may become an advantage from the economical point of view, because it so greatly stimulates improvement in mechanical appliances. Therefore, the fact that in the equipment of the new works at Montreal, the experience of such a firm as Vickers will be available in determining the character and design of all machinery to facilitate production, justifies full hope that

ing of war and merchant ships, and to place such an industry upon a sound commercial basis. The question, therefore, arises as to whether these two ideas should not be brought into close relationship with each other, so that, at no far distant date, Canada may be able to take her share in the building of the Imperial Navy. Thus, whilst spending money on the navy there would, at the same time, be fostered and perfected commercially a great industry, which would be an abiding advantage to the nation.

MARINE ENGINEERING OF CANADA

Development of Auxiliary Industries.

To realize the benefit of such procedure, one has only to reflect upon the enormous gain to the resources of the Mother Country of the privately owned warship building establishments, which have grown up within the present generation by reason of the patronage of the British Admiralty. These naval establishments are to-day a great source of wealth to the Mother Country, not only because of the warships built for His Majesty's Navy, but also because of the many vessels constructed for foreign fleets.

The guarantors of the Montreal Naval

building up of the shipbuilding industry in Canada. There are many incidental industries, which will be nurtured by the establishment of shipbuilding. These are almost innumerable, and of such a nature as would in the end enable Canadian labor largely to supply Canadian demands, apart altogether from the necessities of the maritime trades. This is a point which cannot be too forcibly urged. Statesmen recognize that no Nation can become truly wealthy which depends exclusively on natural products, whether they be agricultural or mineral. The Americans, like the nations of the Eastern hemi-

possibility in this respect? If the case of the maritime trades alone be considered, it is unsatisfactory to discover how small a part is played by Canadian owned ships. Ere yet steam displaced the "unbought wind" in the propulsion of ships, and before steel supplanted timber as the constructive material for vessels, Canadian ships played a prominent part in the transport of goods, the tonnage even as late as 1883 being nearly double that of the vessels owned to-day. In five years, there has been only an increase of 9,000 tons in the tonnage of the shipping registered in Canada, so that there is a call for the



FIG. 2. BIRD'S-EYE VIEW OF CANADIAN VICKERS' SHIPBUILDING WORKS AS THEY WILL APPEAR WHEN COMPLETED.

Works hold such a place in the naval construction history of the world, that every confidence may be reposed in them, and the belief accepted that the money which may thus be spent on the banks of the St. Lawrence will give as economical results as the same money spent in the Homeland.

The full possibilities of the situation are not, however, measured alone by the

where, have fully grasped this economic law, and the aim in Canada ought to be to protect and cultivate those manufacturing industries which yield a greater degree of wealth than the products of the soil, as a supplement and support to the latter.

Decadence of Canadian Shipping.

Has Canada in recent years advanced sufficiently along the line of greatest

building up of a bigger Canadian merchant fleet worthy of the Dominion.

Similarly in the metal industries, there is room for great expansion. The steel bounties, which date only from nine years ago, have had the effect of considerably increasing the making of steel, but further stimulating influences are required. This, an important phase of the question should have full consid-

MARINE ENGINEERING OF CANADA

eration in settling the ultimate policy of our statesmen in regard to our participation in naval defence and the assistance we should render to the Imperial Forces. Shipbuilding works established on the western seaboard, as well as on the eastern, while creating a new industry of far-reaching importance and stimulating other branches of mechanical activity, would give employment to vast bodies of workers, provide means of overhauling and repairing the ships required for naval defence, develop the owning and building of merchant shipping, and generally increase the wealth of the Dominion.

Montreal's Floating Drydock.

Already the Battleship-Floating Dock associated with the new establishment at Montreal, and appropriately named "The Duke of Connaught" by Royal

into three complete parts, so that one or two or all of the sections may be utilized according to the size of the ship to be docked. Thus, it is possible to dock independently and simultaneously three of the vessels engaged in the internal navigation of the Dominion.

Fig. 3 shows the "Montreal," a typical Canadian vessel entering two sections of the dock, which have been sunk by the admission of water into the double bottoms, while the third section is seen separately awaiting another ship.

Fig. 4 shows the "Lake Manitoba," one of the largest of the C. P. R. ocean fleet, undergoing repair within the dock. The "Lake Manitoba" has a length of 470 feet, a beam of 56 $\frac{1}{4}$ feet, and a tonnage of 9,674 tons.

Plant Extent and Equipment.

The establishment at Montreal as it

ed now the concrete foundations, on which the heavy machine tools will be placed.

In the basin, and in the channel forming the exit into the St. Lawrence, there are at work several of the dredges of the Montreal Harbor Commission and of the Government Department, both of whom have heartily seconded the efforts of the promoters towards the realization of this scheme of first-class national importance. Only a few months ago, the site now marked out by the basin walls and the foundations for the machine shops was a small creek or was bedded in the foreshore of the St. Lawrence, much of the land having been reclaimed from the river which is here a mile wide.

Ship Fitting-Out Arrangements.

Fig. 1, and the bird's eye view Fig. 2,

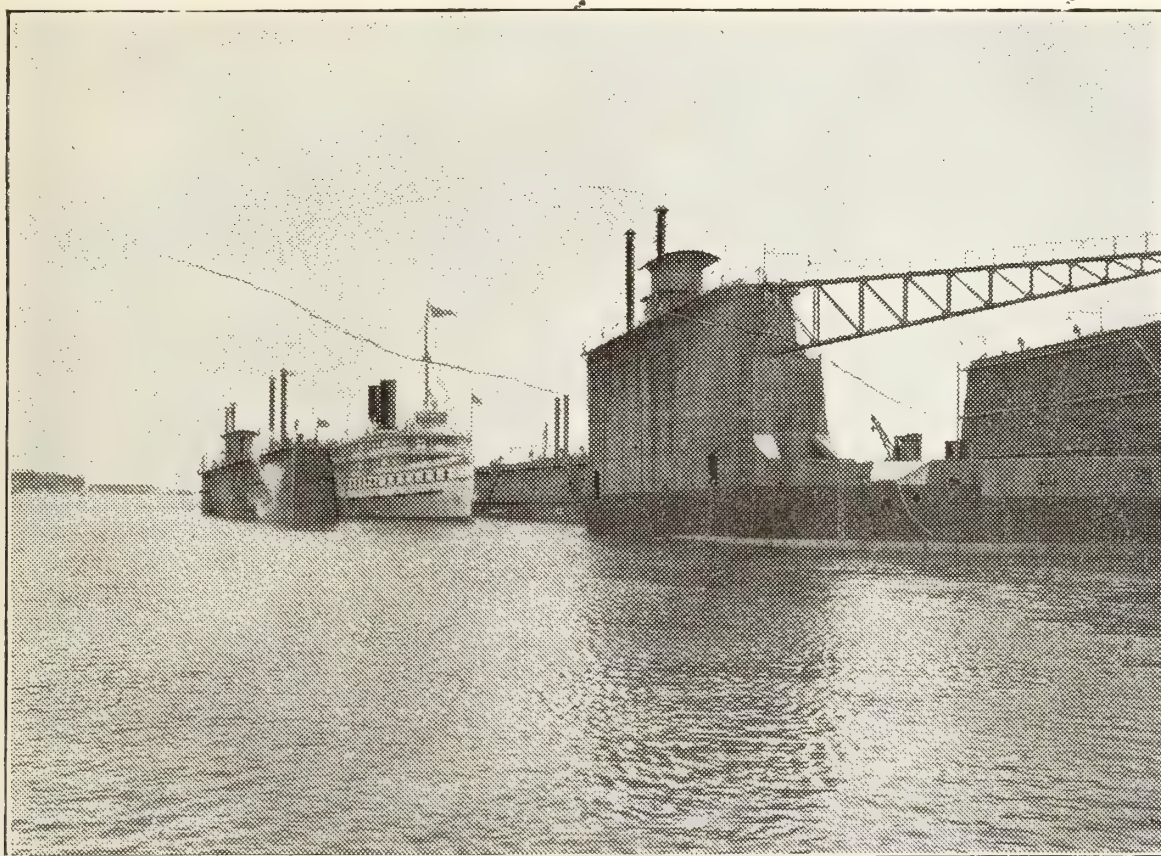


FIG. 3. R. & O. RIVER STEAMSHIP "MONTREAL" ENTERING TWO SECTIONS OF THE FLOATING DRYDOCK.

permission, has done splendid work. Of its capacity, there is no need to write at length, in view of the fact that some of the largest ships trading on the St. Lawrence have already been berthed upon it and have undergone extensive repair. The largest of warships can easily be accommodated because the width between the walls is 100 feet and there is practically no limit to the length of vessels which may be dealt with. Moreover, by characteristic prescience, the management decided to have a dock, which could be separated lengthwise,

appears to-day covers about 45 acres. Men are now busy completing the ship fitting-out basin—12 acres in extent—in which is accommodated the floating dock; the depth of water being 50 feet. The foundations are being put in for the berths at the head of this basin for the construction of ships of the largest size, and these will be launched into the basin. Buildings are being erected to accommodate complete installations of machine tools for the construction of ships, engines, boilers and all marine auxiliaries. There are also being form-

show the works as they will appear when completed. A prominent feature is the ship fitting-out basin formed by two concrete walls almost parallel with the St. Lawrence. At the head of this basin are the shipbuilding berths, now being constructed. These are to be entirely covered in, and are being arranged to take vessels up to 1,000 feet in length, and of proportionate beam. The advantage of covering in the berths is that work may proceed under all weather conditions. The crane arrangement, too, will be such that considerable

MARINE ENGINEERING OF CANADA

weights can be lifted on board, prior to the launch.

As is well known, some new ships built in the Old Country are launched merely as shells with the minimum of work upon them, while others are in a much more advanced condition, all the boilers and many of the auxiliary engines being fitted on board. The pro-

interfering with the pre-arranged date of completion.

Ship Construction Equipment.

The buildings for the accommodation of the ship construction machinery are being erected between the building berths and the river, while those for the construction of the propelling engines and boilers are on the landward side of

will be supplied by the best maker of its respective types.

All the machines will be independently driven by electric motors, and each of the largest will have a crane fitted for the manipulation of plates and angles. Plates up to 40 feet in length, 8 feet in width and 2 inches in thickness are being provided for in the machine capac-

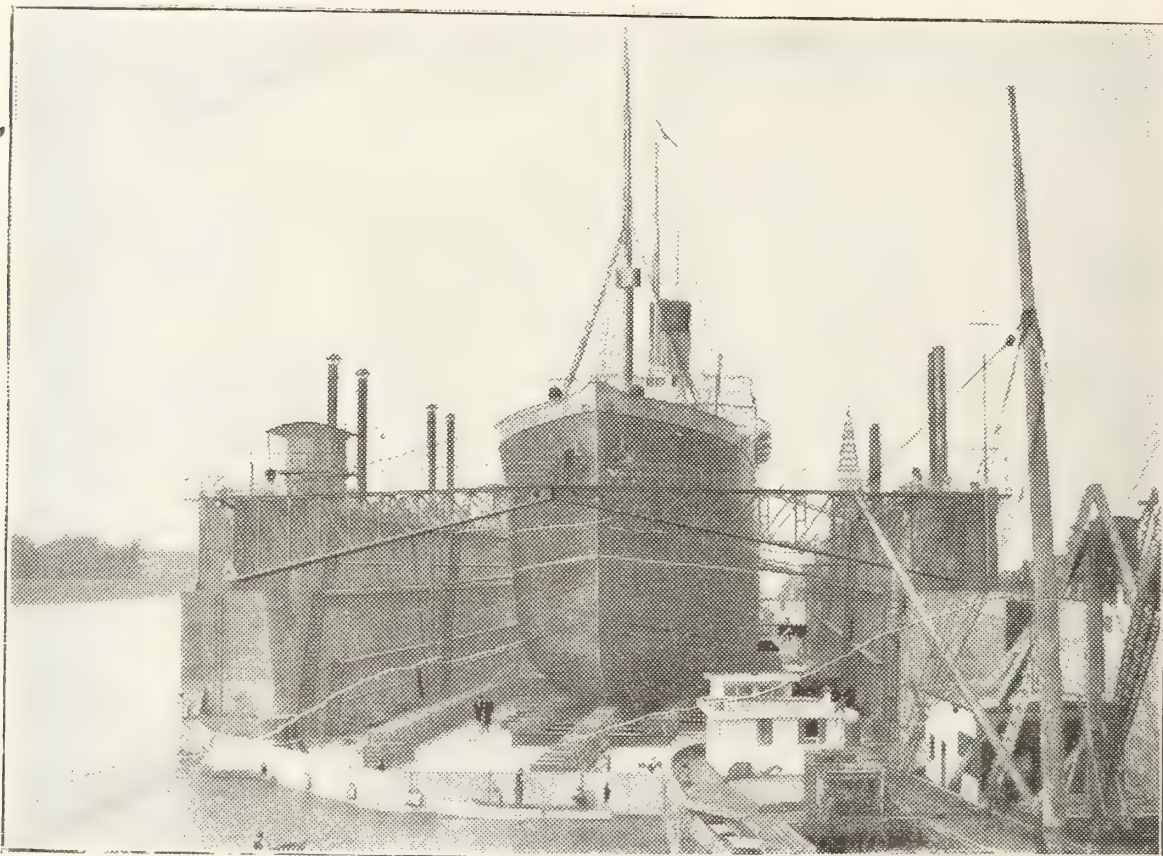
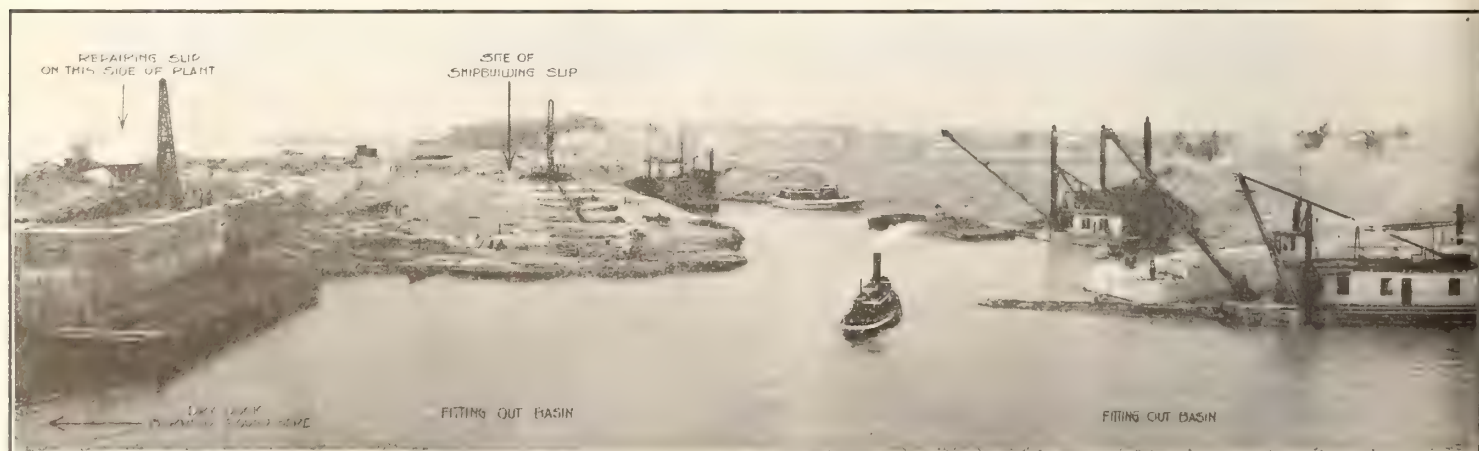


FIG. 4. C.P.R. ATLANTIC STEAMSHIP "LAKE MANITOBA A" UNDERGOING REPAIRS IN FLOATING DRYDOCK.

visions made in the Montreal establishment will enable either the minimum or maximum of work to be done before the vessel is floated, so that the actual date of launching the ship may be advanced or retarded to suit conditions without

the building berths. The construction of these buildings is in progress, and they are of the latest design approved in the shipbuilding world. The equipment of machine tools will be as complete as in any British yard, and each

ity. There is being built an independent department for dealing with angles and beams, and, as in the plater's shed, the furnaces will be operated by gas generated in producers and conveyed to the furnaces, as well as to the black-



PANORAMIC VIEW OF THE SHIPBUILDING SLIPS AND FITTING-OUT BASIN OF THE CANADIAN VICKERS CO., LTD., AT MONTREAL. THE BASIN WAS DREDGED OUT FROM THE BASIN. WHERE THE VARIOUS BUILDINGS ARE TO BE ERRECTED, THE GROUND IS BEING DREDGED OUT. BE ENTIRELY UNDER COVER, THUS ENABLING WORK TO BE CARRIED ON IN ALL WEATHERS. E. G. M. CAPE IS THE CAPTAIN.

MARINE ENGINEERING OF CANADA

smith's fires, in underground conduits.

The blacksmith's shop will contain several steam hammers, each equipped with an electric crane. There will also be in this department a large forge, having alongside a separate furnace. An annealing furnace will also be installed.

Ship Equipment Production.

Independent buildings are being erected for the accommodation of plumbers, sheet iron workers, copper-smiths, wire-workers, tinsmiths, electricians, and other tradesmen, the aim being to carry out practically all work in connection with the building of all types of ships. The joiners, carpenters and others connected with wood work are to be accommodated in a separate building of two stories. On the ground floor, there will be a comprehensive collection of the latest design of machinery and, according to the best practice, all these machines will be driven by electrical motors placed under the floor level. The upper floor will be for hand work only.

Accommodation is also being provided in the same building for the moulding of the ship's frames, etc. There are also riggers' and sail-makers' lofts, having, as in all departments, complete mechanical appliances for ensuring the greatest volume of production for a given amount of labor and supervision.

Propelling Machinery Production.

The building for the construction of propelling machinery will be as complete as any yet devised in any country. The machinery will be designed and built according to the latest experience for the manufacture and repair of all classes of marine and other engines, including steam reciprocating and turbine machinery, oil engines, such as may be fitted to sub-marine as well as surface craft and all auxiliaries connected with ships. In the engine erecting shop which is of specially large ground area there will be installed overhead cranes

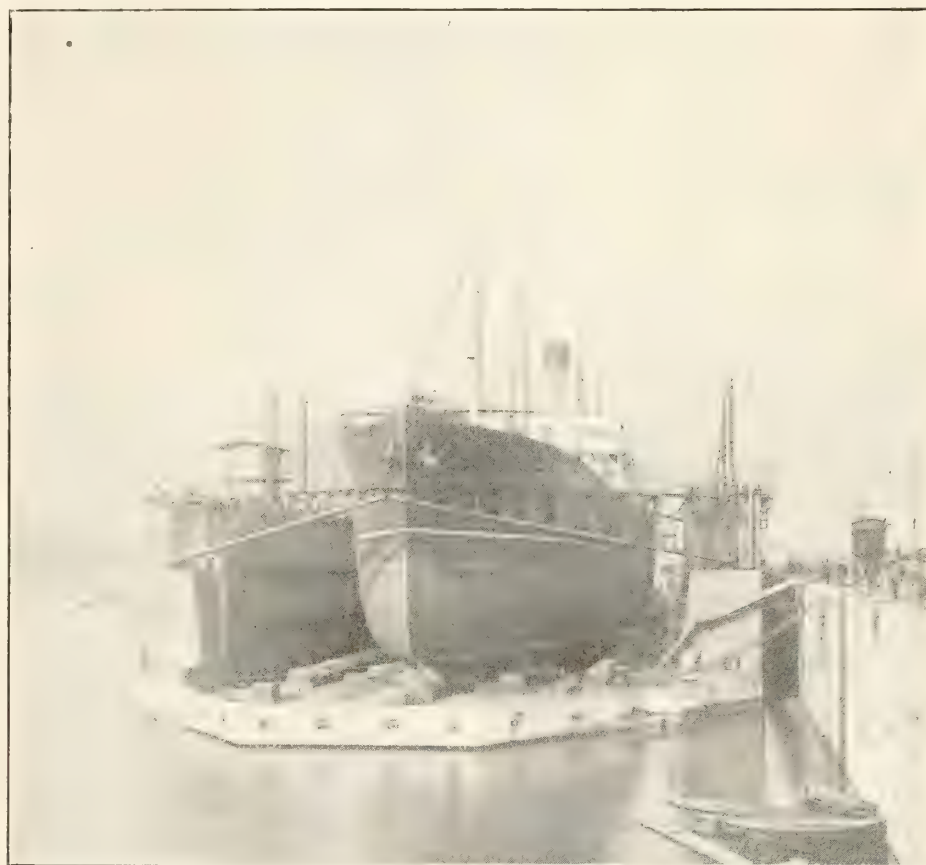
to lift loads ranging up to practically 100 tons.

Some idea of the magnitude of the work which it is proposed to undertake may be formed from the size of some of the more notable tools. There will be a horizontal machine capable of boring 12 feet diameter by 35 feet long; a lathe capable of taking a turbine 40 feet

and other machines will be utilized for the manufacture of guns. There will also be a complete installation of small machine tools for brass finishing and light work, etc.

Boiler Shop and Foundry.

In the boiler shop, which is to be a continuation of the engine factory, of the same dimensions, and equipped with



CANADIAN PACIFIC S. S. "MOUNT TEMPLE" IN FLOATING DRYDOCK "DUKE OF CONNAUGHT," IN MONTREAL. OCTOBER 9, 1913.

long; an 8 ft. chuck lathe with two compound slide rests; lathes for shafts up to 24 in. diameter, and 80 ft. long; in addition to correspondingly large milling, shaping, slotting and wheel-cutting machines, saws, grinders, etc. These

equally powerful cranes, there will be every tool which extensive experience has shown to be efficient for the construction of all types of boilers.

Large foundries for iron, steel and brass, are being arranged, so that the



3, MONTREAL. MOST OF THE LAND COMPRISING THE SITE CONSISTS OF MADE GROUND, SOME OF IT BEING SPOIL ABOUT 2,000 McARTHUR CONCRETE PILES, 16 INCHES IN DIAMETER BY 30 FEET LONG. THE SHIPBUILDING SLIPS WILL FACTOR, THE PILING CONTRACT HAVING BEEN SUB-LET TO THE McARTHUR CONCRETE PILING CO., NEW YORK.

firm will be able to produce their own castings, and make it, in this respect, independent of outside sources for these.

All machine tools in all departments will be electrically driven. The electric power will be taken from one of the local supply Power Companies of Montreal at a pressure of 10,000 volts, and in the plant there will be a central station with three large rotary converters for transforming the current to suit the operation of the various machines, and for lighting the works. An hydraulic accumulator actuated by electrically driven pumps to give a working pressure of 1,500 lbs. per square inch will also be installed, while in connection with the working of pneumatic tools, there will be two air compressors.

Test House and Laboratory.

Every precaution is being taken to maintain as high a reputation in the Dominion as Vickers have achieved in Britain, and for this purpose, there is to be included a well equipped test house and laboratory, containing all the latest appliances. In this department, there will be tested all construction materials, in order to eliminate as far as is possible all defects. It may be added that in arranging the plan of the works, provision has been made so that each building can be extended, and new shops laid down without interfering with the general scheme.

From first to last, the establishment, promises to be as satisfactory and complete for the building of all types of ships for the Navy and Merchant Service as any in the world, and from this point of view the advent of the Canadian Vickers Ltd. on the St. Lawrence will, as already indicated, open up great

possibilities for future developments, particularly as there will be brought to bear in this connection, not only full guarantees for success, but the professional ability, experience and resource of a firm unexcelled in this particular department of applied science.



STERN WHEEL TUG MACHINERY.

THE Polsons Iron Works recently shipped to Hudson Bay a stern wheel tug which they built at their works in Toronto. The tug was built for the Dominion Government for service at Port Nelson. A description was given of the tug in the July issue of Marine Engineering, and we now give particulars of the main engines and auxiliary equipment.

Main Engines.

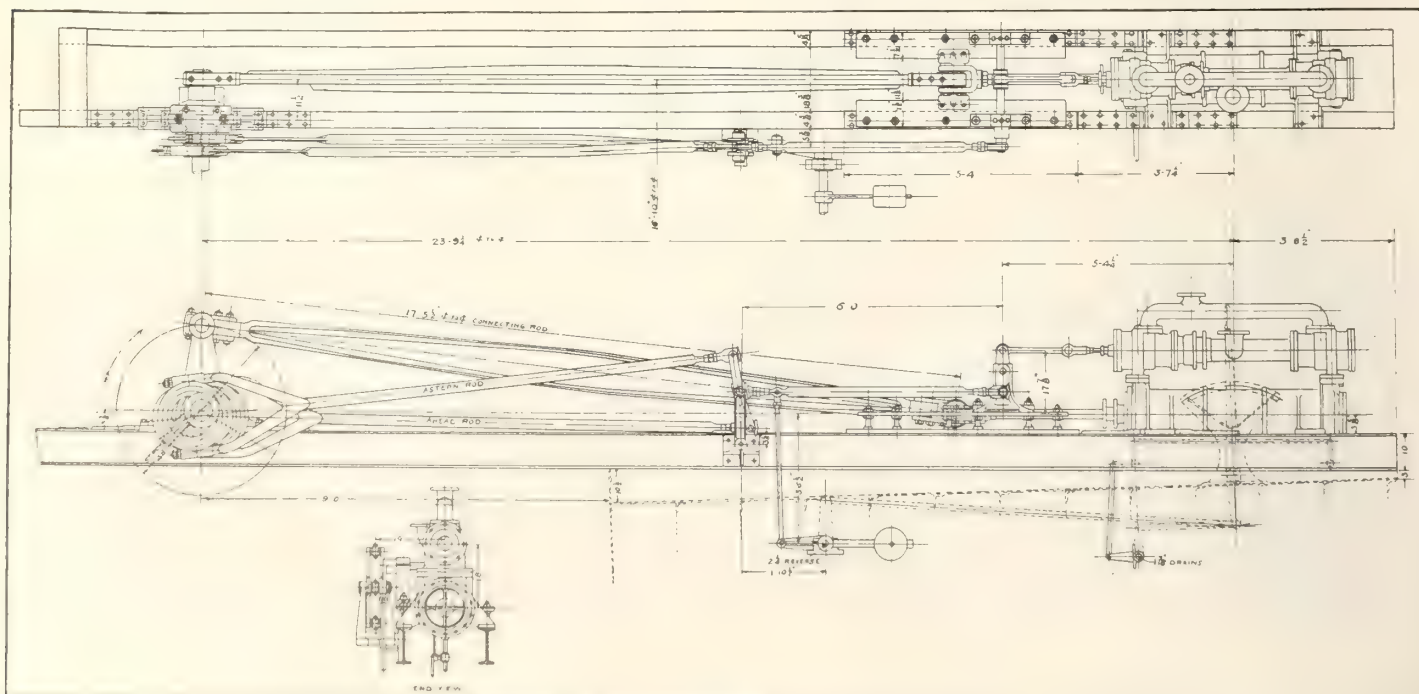
The main engines consist of one pair, port and starboard, and are identically the same design and dimensions, except that they are right and left-handed. They are of horizontal, single cylinder type, located in the stern of the tug, and are connected to the wheel shaft by long connecting rods. The wheel shaft serves as the crank shaft, and is fitted with a crank at each end, set at 90 degrees. The eccentrics are, of course, fitted on this shaft and inside the cranks. The crank or wheel shaft is 6 7-16 in. diameter and is made of mild steel. The stern wheel is 15 feet diameter overall, and has 13 wooden buckets, each 10 ft. long by 14 in. wide. The wheel is carried by 2-1 beams set at an angle and extending out over the stern and supported by out-board brackets. The cylinders are secured to the in-board ends of these I beams which serve as a frame for the engines. The

engines develop a total of 250 horse power at 28 r.p.m.

The accompanying illustration gives an idea of the general design. The cylinders of both engines are 12 in. diam. by 48 in. stroke. The valve gear is of the double eccentric link motion type, and is connected to the eccentrics by rods made of extra heavy wrought iron pipe fitted with suitable connections to the eccentric straps and links. The lever for controlling the valve gear is conveniently located near the cylinders and operates both sets of motion simultaneously. The connecting rods are exceptionally long being 12 ft. centres. They are of special construction in order to reduce the weight as much as possible. Each rod has 2 steel straps with a wood filler between and securely bolted. The connections between the straps and crank and crosshead ends are of special design.

Auxiliaries.

A locomotive type boiler 56 in. diam., by 20 feet long and carrying a steam pressure of 160 lbs. per sq. in., is located forward of the engines. It supplies steam for the main engines and auxiliaries. A No. 12 "National" feed water heater is installed in connection with the boiler. Electric light is furnished by a vertical steam engine driving a 3½ k.w. generator. This set was supplied by the Enberg Electricity & Machine Works, St. Joseph, Mich. Two outside packed duplex pumps 5¼ x 3 x 6 in. are installed for boiler feeding and general service, and were supplied by the Smart Turner Co., Hamilton, Ont. On the deck are installed two double barrel type capstans equipped with 6 x 8 in. double cylinder reversing engines, supplied by the American Ship Windlass Co., Cleveland, Ohio.



ENGINES OF STERN WHEEL TUG FOR HUDSON BAY.

Twenty Years Progress in Vessel Design and Construction--I*

by Alexander Gracie, M.V.O.**

The author in his lecture deals in a racy, yet interesting manner with the development which has marked the combination subjects of marine engineering and shipbuilding, and leaves the reader with the impression that, notwithstanding the great strides made in recent years, and an evident tendency in some quarters to call a halt, there is progress, and achievement equal in degree, looming up in the near future, which will just as far eclipse present accomplishment, as the latter surpassed that of 20 years ago.

IN order to appreciate fully the progress which has been made during the last 20 years in the design and construction of vessels for the mercantile marine, it will be useful to consider briefly the factors for and against advance, so as the better to realize in what direction forward steps have been and may still be possible. The driving forces towards all progress are healthy discontent with what has been done and the satisfaction derived from greater achievement, quite as much as the hope of material gain.

Ideals Aimed At.

The aim of the shipowner, the naval architect and the marine engineer is ever towards increased comfort, speed, and economy. Increase in size is undoubtedly the most valuable resource of the naval architect, as it is directly conducive to the attainment of these three desiderata. The greater the length of a vessel in proportion to her total weight, the smaller becomes the power in relation to her displacement and speed. Greater size gives more deck space for passenger accommodation, greater height above water, and less disturbance due to wave motion; hence greater comfort. The earning factors, space and displacement are increased in greater ratio than the cost factors, and so economy is obtained.

A concrete example illustrative of these principles may possibly be of interest. I will take the case of a cargo vessel having a speed of 13 knots at sea over a 3,000-mile voyage. On a length of 400 ft., we can construct a vessel weighing 3,700 tons, which would carry 4,000 tons of cargo and consume 500 tons of coal. Each 100 tons of cargo, therefore, involves $92\frac{1}{2}$ tons of constructive material, and $12\frac{1}{2}$ tons of coal per voyage.

A vessel 500 ft. in length would weigh 6,750 tons, would carry 8,700 tons of cargo, and consume 700 tons of coal. Each 100 tons of cargo in this case requires only $77\frac{1}{2}$ tons of vessel and 8 tons of fuel. The practical success of the large vessel depends, of course, upon the volume of passenger and cargo traffic she can command, and these vary greatly on the different trade routes. They are notably greatest upon the Atlantic, and it is in this trade that we find the greatest growth in dimensions.

Notable Epoch Makers.

It is the continual aim of the naval designer to realize the greatest dimensions which the shipowner can utilize on the least possible weights of hull, machinery, and fuel. Every improvement in the quality of his materials, every advance in the better distribution of those materials towards the end in view, every reduction in the weight of machinery and of fuel in relation to horse-power, and every progression towards the more effective use of the power developed, is a step towards the ideal large, powerful, and comparatively light vessel.

The introduction of iron about the year 1820, of steel about 1870, of the compound engine in 1854, and of the triple-expansion engine in 1881, were the most notable epoch-makers of the first 80 years of steam navigation. The study of the strength problem by means of the "girder" theory and the labors of the classification societies, have shown how to combine strength with lightness. The introduction of the experimental tank method of research gave us a definite means of designing form and propellers, so that the least possible amount of power is wasted and the greatest possible amount usefully applied.

Achievements of 20 Years Ago.

Up to the beginning of the period under consideration, the changes which have taken place in marine engineering had been shown in a gradual development of the simple type of reciprocating steam-engine. The growing knowledge of the theoretical principles involved in design, the higher standard of materials available for construction, and the steady improvement in machine tools, had enabled engineers successfully to make use of higher steam pressures. The advance marked by the successful introduction of the compound engine about the year 1856 had been followed, in 1881, by the introduction of the triple-expansion type of engine, and the three-crank design of the latter proved itself so fit a variation that it has survived, unchanged in all essentials, to the present day.

Thus, twenty years ago, the triple-expansion engine was in the position of rapidly superseding the compound type in almost all services, and was being successfully constructed to work in con-

junction with steel cylindrical boilers working at a pressure of 160 lb. per sq. in.; both engines and boilers being, in general design, not greatly different from those of the same type which are being built at the present time. I can best convey to you the condition of marine construction at the beginning of the twenty-year period immediately under review by recalling some of the most notable achievements of that time.

The Campania.

On the Atlantic, the premier vessel was the *Campania*, then regarded as a "monster" ship. It was thought by many that the limit of size had been reached and that so large a vessel could never be made commercially successful. She was 600 ft. in length, with a beam of 65 ft. and a depth of 41 ft. 6 in. Her gross tonnage was 13,000, her trial speed 22 knots, and her horse-power 30,000. She was, of course, fitted with twin screws, and her engines were of the triple expansion type, with five cylinders working on three cranks. The condensers were of cast iron, and, as was usual at that time, formed part of the engine framing. No arrangements were made for balancing the inertia effects of the reciprocating parts.

The main boilers were of the double-ended cylindrical type with a working pressure of 165 lb. per sq. in. She burned about $1\frac{1}{2}$ lbs. of coal per indicated horse-power per hour and 480 tons daily. Of her displacement, $48\frac{1}{2}$ per cent. was devoted to weight of hull, $21\frac{1}{2}$ per cent. to machinery, $14\frac{1}{2}$ per cent. to fuel, $4\frac{1}{2}$ per cent. to passengers, stores, and water, and 11 per cent. cargo. She carried 570 first-class, 300 second-class, and 600 third-class passengers, and a crew of 400. Her first-class public rooms were six in number; they occupied a total area of 9,214 square ft., or an average of about 16 sq. ft. per passenger, while the average state-room area was about $17\frac{1}{4}$ sq. ft. per person. The average number of persons per room was 3.2. Second-class passengers had but 8 sq. ft. of public room each and 14 sq. ft. of state-room.

The Kaiser Wilhelm der Grosse.

Compared with most modern vessels of large size the *Campania* was shallow in relation to her length, the ratio of length to structural depth being 14.45. In consequence of her shallowness, as a

*James Forrest Lecture.

**Managing Director, Fairfield Shipbuilding and Engineering Co., Glasgow.

girder, the scantlings of her gunwale and bottom had to be very heavy in order to obtain the necessary longitudinal strength, and it was some years before ships were built in which the upper member of the strength girder was raised to a higher deck.

The Kaiser Wilhelm der Grosse, built in 1897, surpassed the Campania in length by 25 ft., but although her sides amidships, as in most subsequent vessels, were plated one deck space higher than in the Campania, the plating was comparatively light, the deck to which it extended was not plated over, and the top member of her strength girder remained at the upper deck, the length-depth ratio being slightly in excess of that of the Campania. Her ocean speed was about 22¾ knots, with 30,000 indicated horsepower. Her coal capacity was 4,600 tons. She had accommodation for 600 first-class, 300 second-class, and 800 third-class passengers.

The Deutschland.

In 1900 came the Deutschland, 663 ft. in length, similar in appearance and structural arrangements to her immediate predecessor, her length-depth ratio being over 15, and the main girder stopping at the upper deck level 44 ft. above the keel. Her horse-power was in the neighborhood of 35,000; capacity for 4,800 tons of coal was provided, and her ocean speed was about 23¼ knots. Her engines were of the greatest actual dimensions reached in the reciprocating type, and were of the four-crank quadruple design.

The Deutschland accommodated 700 first-class passengers in 266 rooms, an average of about 2.6 persons per room; 300 second-class, and 290 third-class passengers. Luxuries were beginning to creep in, some of the state-rooms having private bath-room attached, while for some of her suites as much as \$1,250 was charged for a single voyage.

The Celtic.

In 1901 the length was increased by 20 ft. in the Celtic, built for the White Star Line, 680 ft. in length, with a beam of 75 ft., and a depth of girder of about 52 ft. In this, as in most vessels of the White Star fleet, only a comparatively low speed was provided. The consequent smallness of horse-power reduced both first cost and fuel-consumption, while the fuller form gave roomier deck-spaces and greater dead weight carrying power. Since the total deadweight was increased, and the proportion given up to coal reduced, there was a double increase in the weight of freight-earning cargo.

Speed is an expensive item. On the length of 680 ft., a 16-knot vessel can carry 12,000 tons of cargo on an expenditure of 2,000 tons of coal over an

Atlantic voyage, while an increase of speed to 22 knots would reduce cargo to 3,000 tons, and increase coal to 3,500 tons, besides increasing first cost by about 25 per cent.

The Kaiser Wilhelm II.

Next year came the Kaiser Wilhelm II., 684 ft. long and 44¼ ft. in depth to her upper deck, but with her sides plated all fore and aft up to the level of a continuous promenade deck 8¼ ft. above the upper deck. Her depth of girder was thus 52½ ft., and her length-depth ratio only 13. A better distribution of structural material was realized and excessively heavy local scantlings avoided.

Besides having her main structural weights higher than usual, she had one deck more above her main structure than any of her predecessors, and these additions to the weight and height of her upper structure necessitated a corresponding increase in breadth, which was made 72 ft., as compared with the Campania's 65 ft. and the Deutschland's 67 ft. Similar increases in transverse dimensions in relation to length have characterized all subsequent advances, and the number of superstructures has steadily increased in order to afford deck space for the increasing numbers of public rooms and more spacious cabin accommodation by which each successive vessel was rendered more attractive than the last.

The Kaiser William II. had four engine-rooms, in which were developed about 45,000 indicated horse-power and a speed of over 23½ knots was maintained at sea. Her coal capacity was 5,000 tons and her passenger accommodation consisted of 770 first-class, 350 second-class, and 780 third-class. \$2,000 was charged for a suite of rooms.

The power transmitted per shaft in this vessel was about 25 per cent. greater than in the previous unit, and 2 three-crank quadruple engines were fitted to each line of shafting in order to reduce the dimensions of the cylinders and working parts, a scheme which lent itself naturally to more complete subdivision into watertight compartments. This arrangement, which was also tried in some naval vessels, was, however, not repeated in later practice. The machinery of this ship represents the largest power of any installation of reciprocating engines in the merchant service; the next advance in total power being with turbine machinery.

The Cedric, Amerika, Kaiserin Augusta Victoria.

Within the next few years the Cedric, Amerika and Kaiserin Augusta Victoria appeared, all about 680 ft. in length, and carrying still further the development in number and extent of superstructures, public rooms and luxurious

cabin accommodation. The Amerika had six decks above the waterline as compared with the Campania's four, but in none of these vessels was high speed attempted.

Reciprocating Engine Development.

The further development of the reciprocating engine since the beginning of our survey has been in the use of still higher initial pressure, and in the extension of the series expansion principle in the quadruple-expansion type of engine. The use of higher pressure followed naturally upon the success of the triple engine, and for pressure above 180 lbs. per square inch the quadruple type became necessary in order to take the fullest advantage of the increased heat energy available in the steam.

Compared with the gain in fuel economy effected by the triple-expansion over the compound engine, the further improvement due to the increase in steam pressure to 215 or 220 lb. is naturally small, being about 7 to 8 per cent., and against this has to be put the increased weight, cost, and upkeep of the quadruple type.

For ships trading on long voyages, and more especially for passenger ships, or large units, where a four-crank engine would be fitted, in any case, on account of its greater smoothness in running, the quadruple engine has now superseded the triple-expansion type, but in the case of cargo carriers, where low first cost and easy supervision are primary conditions, the triple engine still holds its own.

Changes to be Noted.

In the essential design of the reciprocating main engine, improvements seem difficult to attain. Some changes, however, may be noted.

Condensers are now usually kept separate from the main framing, and, in order better to withstand extremes of temperature, are frequently constructed of mild steel instead of being cast as formerly; and much more attention is also given to their design with a view to improved thermal results.

Air-pumps have been improved in design, and in most large or fast-running engines are now fitted as separate auxiliary engines instead of being driven from the cross-heads.

Attention has been directed to devising means of balancing the engines in order to reduce vibration troubles. The first attempt to solve the problem of balancing was made by Messrs. Yarrow, and the method known as the Yarrow-Schlick-Tweedy system is now adopted in most engines of the four-crank type. This method consists in arranging the relative positions of the various reciprocating and revolving masses, by adjusting the angles between the cranks, so

that the inertia effects are reduced to a minimum.

Reduction in fuel consumption has been obtained by the collective effect of a number of small savings; by the improved condenser and air-pump; by the utilization of the auxiliary exhaust for feed-heating and by heat economy in various ways.

Limits of Reciprocating Engine.

In the constant endeavor to provide greater intensity in power production, increase in piston speed and rate of revolution have been achieved through experience in design and a better quality of material and workmanship, but, where conditions of exceptional power, or lightness per unit of power, or both of these, have to be considered, the limitations of the reciprocating type of engine become apparent.

In addition to the difficulties of construction and management of very large units, the reciprocating engine had, as already remarked, reached a point where further improvement in steam consumption was not easily attained; while further reduction in weight involved increase in speed of rotation, with its attendant difficulties.

The Steam Turbine.

Thus the introduction of the steam turbine proved opportune, by providing a way to further progress in economy, lightness, and the construction of very large units, while at the same time eliminating vibration troubles and relieving the difficulties of engine-room management. The turbine entered the Atlantic lists in 1905, when the *Victorian* and *Virginian*, 520 ft. in length, took up their stations, and in 1905 the 650-ft. *Carmania* also used the new motor.

The 700-ft. mark was passed in 1906 by the building of the *White Star* liner *Adriatic*, 709 ft. by 75 ft. by 56 ft., with twin-screw quadruple engines of about 15,000 indicated horse-power. Her speed was but 15 knots, and she carried 450 first-class, 500 second-class, and 1,400 third-class passengers, 2,500 tons of coal and 6,500 tons of cargo. Of her total displacement, hull claimed about 56 per cent., machinery 10 per cent., fuel 8 per cent., cargo 21 per cent., passengers, stores and water about 5 per cent.

A comparison of these approximate figures with those already given for the *Campania*, shows that, per annum, the *Adriatic* could carry twice as many passengers and three and a half as much cargo per ton of fuel as the *Campania*. This well illustrates the cost of speed, and justifies the enhanced rates charged to those availing themselves of the faster vessels.

Lusitania and Mauretania.

The turbine, having proved its worth

in the realm of high power and fast steaming, was boldly adopted by the Cunard Company in the *Lusitania* and *Mauretania*, built in 1907. These vessels surpassed all others with a length of 760 ft., 88 ft. of beam, and 60½ ft. depth of girder. The girder ratio was thus about 12½, and for the first time high tensile steel was utilized in the upper member to meet the higher stresses. Some lightening of structure was thus obtained.

They were the first mercantile vessels to have four lines of shafting, and practically the whole of the vessel's length was occupied by boilers, machinery and fuel. About 68,000 horse-power was developed, and an ocean speed of between 25 and 26 knots regularly maintained, on an expenditure of about 5,000 tons of coal per voyage. Although already surpassed in dimensions, these two vessels retain their supremacy in speed unchallenged.

Turbine and Reciprocating Engines Combination.

In 1908 a further step was taken with a view to securing a greater reduction in steam consumption per effective horse-power. This consisted in the combined use of the reciprocating steam-engine and turbine in order to retain the low speed of revolution of the reciprocating engine with its accompanying favorable propeller efficiency, while at the same time effectively utilizing the expansion of the steam to the condenser pressure.

The first ship to be thus fitted was the *Otaki*, a vessel of 464 ft. in length and about 9,900 tons dead weight capacity; and a comparison of this ship with a sister ship fitted with ordinary twin-screw quadruple engines showed a difference of about 20 per cent. in steam consumption per effective horse-power in favor of the combination type of machinery.

The usual practice has been to fit the reciprocating engines on the wing shafts, and the exhaust turbine on a centre shaft; an arrangement being made for exhausting the steam from the reciprocating engine direct to the condenser, and thus cutting out the turbine during manoeuvring.



THE SHIPOWNER'S BUSINESS.

UNDER the auspices of the Faculty of Commerce of the Armstrong College, Newcastle-upon-Tyne, Mr. A. A. Booth, chairman of the Cunard Steamship Co., Liverpool, delivered a lecture at the College on "The Shipowner's Business."

After referring to the magnitude of the subject, he said, I suppose we are all agreed that the shipping industry lies at the very root of national prosperity.

This fact is brought out very clearly by some figures which Sir George Paish, the editor of the "Statist," has been good enough to give me. In the current year he estimates that our net imports will be of the value of about \$3,310,000,000. Of this total, the income from shipping will pay for about \$550,000,000; our income from foreign investments nearly \$1,000,000,000; the services rendered to other countries by our bankers, brokers, etc., about \$150,000,000; and goods exported would provide the balance of about \$1,610,000,000. As a matter of fact the total value of the exports of Great Britain this year Sir George estimates will be about \$2,620,000,000. The difference of about \$1,000,000,000 represents the amount of capital which the country will have invested abroad during the current year.

Place and Part of Shipping.

You will thus see that the income from our shipping pays for about one-sixth of our total imports, but even this is by no means a complete statement of the services rendered by the trade. The other items in our international balance sheet, imports, exports, foreign investments, bankers' and brokers' services, depend every one of them on the means of communication which our shipping trade has established with every corner of the globe.

The capital value of the shipping now owned under the British Flag may be stated approximately at \$750,000,000, but this value is only a part of the capital required for the maintenance of our sea-carrying trade. We have the shipbuilding yards, which play such an important part in the harbors and docks and the railway facilities connected with them; the coal trade, in so far as it produces fuel for ships' bunkers, and all the varied organizations and industries which must be called upon before a vessel can go to sea fully manned, equipped, stored and provisioned.

Here let me interject one remark about the coal trade. We sometimes hear people bewail the enormous export of coal from Great Britain, and an export tax, even a heavy export tax, has often been advocated for the express purpose of discouraging this export and conserving the product of our mines for home use. It is, no doubt, a sufficient answer to point out that if there were no outward coal freights the homeward rates on raw materials and food stuffs would in many cases be materially higher. We must also remember that a very large part of the coal we nominally "export" is really not used by the foreigner at all, but for the homeward bunkers of our own steamers.

With the shipping trade then covering such a wide area, it would clearly be im-

possible for me to deal with all its ramifications. I propose therefore, to confine myself to certain features which have come within my own experience, asking you at the same time to remember that this experience has been very largely confined to a particular kind of liner business in which the passenger trade is the most important factor.

Successful Shipowning.

Whatever the nature of the business in which the shipowner may be engaged, it is of the very first importance that he should have the right tools to carry on his business with safety and efficiency. It is no exaggeration to say that the most successful shipowner is he whose ships are best suited to the trades in which they are engaged, who has the courage to discard unsuitable ships, even at a considerable loss, and who has the skill to design or choose what is right for his purpose.

The Naval Architect, therefore, stands at the root of the shipowner's business, and this is just as true of a cargo as of a passenger trade, but as an illustration of the many factors which have to be taken into consideration in designing a ship, I propose to give you some account of what I may perhaps call the prenatal history of the *Aquitania* as a case in point.

Development of the *Aquitania*.

We had in this case at any rate one definite condition to fulfil. A steamer was required which could run in conjunction with the *Lusitania* and *Mauretania* in the New York mail service from Liverpool. Her speed had, therefore, to be such that she would be able to make the round voyage and sail again in three weeks. A speed of 23 knots was decided on as the minimum which would fulfil this condition satisfactorily.

We had of course in our possession very valuable data with regard to the working expenses and earning powers of the *Lusitania* and *Mauretania*, but an annual payment of \$750,000 is received by the Cunard Company on account of these two steamers under the terms of the well-known agreement between H. M. Government and the Company. This payment works out at approximately \$25,000 per voyage.

The next problem therefore, was whether we could produce a vessel which, without the subsidy, would be at least as good an investment as the *Lusitania* and *Mauretania* with the subsidy. In other words, could we increase the average net earnings per voyage by \$25,000 as compared with the *Lusitania* and *Mauretania* either by reducing the expenses or by increasing the earning capacity, or by a combination of the two?

Difficulties Encountered.

We began early in the year 1910 by considering a vessel of about the same

dimensions as the *Mauretania*, 800 feet long, but we soon saw that while the saving in expense would be considerable owing to the reduction of speed from 25 to 23 knots, the additional space made available for passengers or cargo would be much too small to bring about the balance we were aiming at. Moreover, a vessel of the same dimensions as the *Mauretania*, but of considerably less speed could not be expected to be equally attractive to passengers.

A number of tentative plans were then drawn up on a length of 850 feet. The study of these plans definitely established, first that, in order to provide the accommodation we needed from the revenue point of view, we must have seven living decks, not counting the boat deck, and secondly, that the height of structure thus required would involve an entrance width of at least 92 feet, to secure stability. We here reached a temporary deadlock, for the width of the largest entrance to the Liverpool docks at that time was only 90 feet.

The dock Problem Solved.

We took the Liverpool Dock Board into our confidence, and explained to them exactly how it was that we could not build any commercial ship of the type required of such dimensions that she could enter the Liverpool docks. After a careful study of the question, the Dock Board decided to proceed at once with the construction of a new dock with a length of 1,000 feet, and an entrance 120 feet wide, which could be used either as a wet dock or as a dry dock and should be ready by the time the *Aquitania* came into service. This dock I may say was formally opened by the King last July, about three months after the *Aquitania* was launched, and will be ready for actual use this year.

The way was now clear for us to go ahead, so we proceeded to develop our plans on the general lines already settled, but the tentative plans showed that it would be desirable, now that we were no longer hampered by docking limits, to increase our dimensions to 885 feet, and 95 feet beam. In October we were ready to invite tenders and in December we were able to close the contract, nearly a year after we had begun our continuous study of the problem.

I should add that meanwhile model experiments had been made in John Brawn & Co.'s tank at Clydebank to confirm our estimate of boiler power and speed. As the result of these experiments we decided to add 15 feet to the length of the vessel. We found we could do this without affecting the speed to any appreciable extent, while the additional length enabled us to improve the coal bunker accommodation and at the same time to remove some weak points in the general arrangements of the ship.

The *Aquitania* is, of course, a somewhat exceptional vessel, but considerations of a similar nature are involved in the design of any ship, whether a passenger liner or a purely cargo steamer. In every case, we must be guided by the experience derived from other vessels in the same trade, and by an estimate of the direction which the development of trade may take. We have to take into account the limitations imposed by commercial considerations on the one hand, and by such physical facts as the depth and width of harbors, channels and canals.

Propelling Machinery.

So far we have been considering only the design of the ship as a passenger or cargo carrier, and I have said nothing about the choice of propelling machinery. It is not so very long ago that there was no choice in the matter at all except in details. The power was necessarily steam generated in an ordinary marine boiler, and applied through a reciprocating engine. As the improvements in boiler construction rendered higher steam pressures possible, so we passed from the simple to the compound, and from the compound to the triple expansion engine, but here the straightforward lines of advance stopped.

Quadruple expansion engines were freely adopted for high powers, where the small percentage of saving in the cost of coal would work out to a sufficiently high figure on a year's working, to justify the increased first cost of the machinery, but the triple expansion engine remained the standard type for all ordinary marine work. A new line of advance was opened up by the turbine engine, and now another turn of the wheel has brought before us the possibilities of the internal combustion engine.

At first sight the range of choice for the shipowner seems bewildering, but in actual practice the problem will be found to take a simpler form. I might perhaps describe the situation to-day in the following way. For very high powers the direct acting turbine steam engine holds the field. For more moderate powers we may adopt either the quadruple expansion reciprocating engine or a triple-expansion engine with an exhaust turbine, or, again, small high speed turbines coupled to the propeller shafts by toothed gearing. In this last connection, the possibilities of electrical or hydraulic transformers must not be overlooked. For low powers we shall still in all ordinary circumstances adhere to the triple-expansion reciprocating engine, though, in some cases, we shall wisely experiment with the Diesel engine or with the Parsons' geared turbine.

SAFETY OF LIFE AT SEA.

IN connection with the International Conference on the Safety of Life at Sea, which, opened in London on November 12, the following countries accepted the invitation of his Majesty's Government to be represented:

Belgium, Denmark, France, Germany, The Netherlands, Norway, Russia, Spain, the United States, besides which, the United Kingdom, Canada, and New Zealand are represented.

It is the object of the Conference to endeavor to bring about an agreement among the participating States with reference to the conditions necessary for safety to be laid down in the case of passenger steamships, and with reference to other measures in the interests of the safety of maritime passenger traffic. The safety regulations affecting passenger steamers which will be considered by the Conference will include those relating to boats and life-saving appliances, bulkheads and watertight compartments, fire-extinguishing appliances, manning of boats, boat drill, fire drill and bulkhead drill, wireless telegraphy assistance to ships in distress, ice warnings, ocean steamship routes, etc. The question of load-line will be considered by a separate Conference, which will meet next year.

CANADIAN LLOYDS' IDEA REVIVED.

THE heavy loss of life and property sustained as a result of the recent tempest on the Great Lakes and which inevitably will hit hard the insurance companies affected, revives the question of the establishment of a Canadian Lloyds. For some years the British Lloyds' has discriminated against the St. Lawrence route, while high rates have been quoted on Canadian business generally. Recent happenings are not calculated to improve matters. With the opening of the Hudson Bay route there will be need for additional insurance risks, and the rates to be quoted by the British companies are expected to be pretty high.

Assisted, if Not Run by Government.

In view of the present circumstances, and considering the fact that despite the aids to navigation, the movement for lower insurance has never been effective, impetus is given to the establishment of a Canadian Lloyds' substantially assisted if not operated by the Government. This has frequently been mentioned as possible, but, curiously enough, the interests most vitally affected have never been active with suggestions or proposals.

An inquiry by the Government into the late disasters, has been proposed, and may be carried out. It has been claimed

that the failure of captains to take note of storm warnings was a large factor in the wrecks, while it has also been urged that wireless equipment and devices for sprinkling oil should be carried by steamers.

Any inquiry that may be held will have as its object such regulations as are calculated to minimize the chances of repetition of the disasters.

LIFE SAVING BY ROCKET APPARATUS.

DURING the year ending June 30 last, 250 lives were saved on the coasts of the United Kingdom by means of the rocket apparatus. These were 75 more than the average for the previous ten years, but 17 less than the number saved in the twelve months ending June, 1912. Since 1870 the total number of lives saved by the rocket apparatus has been 9,967. This total is exclusive of a large number saved by means of ropes and other assistance from shore.

Rocket Equipment.

The figures are given in the Annual Board of Trade Report, issued recently. The report shows also that new rocket apparatus has been established during the year at twelve stations, while a heaving-cone and half-whip apparatus has been placed on Dover breakwater. Two rocket apparatus stations and one heaving-cone station have been closed. The total number of life-saving stations now under the control of the Board of Trade is 349. There are also 253 stations supplied with belts, or belts and lines for life-saving purposes. This is a reduction of 114, as compared with the total on June 30, 1905, the diminution being due to reductions in the coastguard and the abolition of coastguard stations.

In addition to the coastguard, there were on the 30th of June 399 life-saving companies, numbering in all 4,529 volunteers, and five brigades, with a total membership of 346, employed in the life-saving service. During the year four silver and eleven bronze medals for gallantry in saving life at sea were awarded by the King, and several money awards were granted for special services in connection with the working of the apparatus. In addition, 120 of the King's medals were awarded for long and meritorious service with the rocket life-saving apparatus.

Artificial Respiration Equipment.

The Board of Trade has adopted for use in the rocket life-saving service Professor Sir E. A. Schafer's method of artificial respiration for the apparently drowned, and the directions given for its use are printed with illustrations in the report. Shortly stated, the method

consists in alternately applying and relaxing pressure with the hands on the small of the patient's back, after he has been placed in a completely flat position, face downwards, with the arms extended and the face turned to one side.

The object of the downward pressure is to force the air out of the lungs, and that of the relaxation of pressure to cause the air to be drawn in again. The pressure lasts while the operator slowly counts three, and the relaxation while he slowly counts two, the forward and backward movements of the operator being continued at the rate of about 12 to 15 per minute till natural breathing has commenced, and, if necessary, persevered in for two or three hours.

LIGHTHOUSES AND SLAUGHTER OF BIRDS.

IT is an ironic fact, says "Syren and Shipping," that lighthouses and lightships, whose powerful beams serve as a protection to human life, are directly responsible for the slaughter of hundreds of thousands of the beautiful feathered immigrants whose sweet music is heard in our countryside during the summer months. Under certain conditions of weather, according to one authority, a lighthouse becomes a veritable shambles, and he adds that those who have not witnessed a "bird-night" at a light station cannot form any conception of the appalling loss of life that takes place.

There appears to be some difference of opinion as to the primary cause of the tragedy. Some naturalists maintain that the birds are dazed by the glare, and strike the lantern with such force as to be maimed or stunned. A Dutch professor, on the other hand, holds that the majority are merely attracted, moth-like, to the light, and that they circle about it for hours until, from sheer exhaustion they fall and perish; or, again, they are deluded into the belief that morning has arrived, and with it the end of their journey, and that they fly about seeking the desired alighting-place.

The professor accordingly devised a series of perches which could be attached to the lantern itself without interfering with its illuminating power, and by arrangement with the Dutch lighthouse authorities, he fixed these about three years ago, at the Terschelling light, on the Frisian Islands. The perches are ladder-like devices placed round the platform and on the roof, as much as possible within view of the light, which, by the way, is 30,000,000 c.p.

Since these perches were erected, the mortality of birds during the migratory season has not exceeded a hundred,

whereas previously, thousands used to perish in a single night. On a dark night, says the professor, every perch is occupied, the birds clinging to them in clusters to the number of quite ten thousand, providing, as may be imagined, a remarkable spectacle. When dawn arrives the whole company, including even the latest comers and the most fatigued, rise in a cloud and resume their journey.

The British Royal Society for the Protection of Birds have been so impressed with the results of the Terschelling experiment that they have approached Trinity House, who have consented to test the contrivance at St. Catherine's Light and the Casquets, both of these lights being on the main migration routes, and both being responsible for great loss of bird life.



A Port Arthur Protest.—The alert Board of Trade at Port Arthur, Ont., and many private firms in the city are making strenuous objection to the steps being taken to bring the new steamer *Neronic* to Sarnia to be completed. The Port Arthur people point out that the Shipbuilding Company received a bonus from that city, and that the inducements were the employment that would be offered to the citizens, and supplies that would be bought, etc. They claim that the removal of the boat means that nearly two hundred men will be employed in Sarnia all winter, that otherwise would be employed in Port Arthur, with a corresponding loss to the business revenues of the city.

NEW GOVERNMENT ELEVATOR AT PORT ARTHUR, ONT.

THE new Dominion Government terminal elevator at Port Arthur, Ont., is now ready and in operation. It is the result of a long agitation by Western farmers who wanted the guarantee of the Government behind the marketing of their grain at the Head of the Lakes. The people's elevator, as it is known locally, will be the standard for many years to come. It is absolutely the last word in elevator construction, is the biggest individual elevator in the world, and brings Port Arthur's elevator capacity up to 15,350,000 bushels. There is also a large capacity at the sister city of Fort William.

Constructional Features.

The elevator is of reinforced concrete construction throughout and fireproof. The machinery is operated by electric power, a separate motor being installed for each unit. Twenty cars can be unloaded simultaneously, the unloading capacity of the house being forty cars per hour. An interlocking device connecting the valves of the car hoppers prevents any possibility of the mixing of the contents of one car with another.

The normal loading capacity to boats is about 75,000 bushels per hour, but for the first hour this can be increased to 115,000 bushels. The working house towers to a height of 185 feet above water level, and contains 75 circular bins of about 7,000 bushels capacity each, 56 interspace bins of 3,000 bushels, and 36 outer space bins of 1,500 bushels each. The total capacity is about 750,000 bushels.

The storage house has 70 circular bins, each 24 feet in diameter and 90 feet in height, of 30,000 bushels' capacity, together with 54 inter-spaces of about 8,000 bushels each, giving a total capacity of 2,500,000 bushels. The total capacity of the elevator is, therefore, 3,250,000 bushels. In designing the elevator, especial provision was made for a large number of bins of small capacity for storing small lots of grain that may require separate binning.

Cleaning and Drying Plant.

The working house is equipped with 10 hopper scales of 2,000 bushels each, with a garner of equal capacity over each scale. The elevator legs are as follows:—Five for receiving, 5 for shipping, 5 for cleaning, 1 for screenings, 1 for drying, 1 for oats, and 2 for flax. Fifteen sets of receiving cleaners are provided for cleaning oats, wheat, and barley, and 15 additional cleaners can be installed when needed. Special machines are also installed for separating oats from wheat, in addition to two screening separators and two flax separators.

Separate Drying Plant.

At the south side of the working house, a drying plant is installed in a separate building. This has a capacity of 48,000 bushels per day, and is for drying damp, tough or wet grain, and putting such grain in condition for storage.

A revetment wall is being built around three sides of the site, which contains about 32½ acres. The site was formerly covered by water, but it now filled in level with the top of the revetment wall.



DOMINION GOVERNMENT NEW TERMINAL ELEVATOR AT PORT ARTHUR, ONT.



GOVERNMENT TIDE TABLES.

THE annual brochure on tide tables for the eastern coasts of Canada has just been published at Ottawa, for the year 1914. It has been edited by W. Bell Dawson, superintendent of tidal surveys, on behalf of the Current and Tidal Survey of the Department of Naval Service. The tide tables, with tidal differences for other places, are based upon observations obtained by means of self-registering tide gauges, which are kept in continuous operation day and night throughout the year.

The records are reduced by the latest methods of analysis, by which the tidal constants are arrived at, and from these the six principal tide tables are calculated in the Nautical Almanac office, London. Information is also given with regard to currents, including those of the Gaspé and Anticosti coasts, Northumberland Strait, the Gut of Canso, and those off the south and east coasts of Newfoundland, and at the entrance to the Bay of Fundy.

A similar pamphlet is published with regard to the Pacific Coast of Canada, including Fuca Strait, the Strait of Georgia, and the northern coast, together with data for slack water in the navigable passes and narrows.

GREAT LAKES INSURANCE.

ON November 18 the American Marine Underwriters announced that they would cover ship sailings at 1 per cent. for vessels loaded prior to midnight, December 4th, and sailing not later than midnight, December 5th. For ships loaded prior to December 7th, and sailing before midnight, December 8th, risks will be carried at 1½ per cent.

English underwriters have not as yet named a rate; but it is anticipated that they will give the rate published by the American Company. It would be very surprising if the American rates are not the same as the English rates, and that the two have come to an understanding with respect to the December business.

Policies for extended sailings will not cover ships going east of Lake Erie. For vessels removing from one port to another on the same lake during the first week of December, the premium will be ¼ per cent. So far but few formal ap-

plications for December policies have been received by underwriters. It is probable that the recent storm will stimulate late December business.

NAVAL EXPENDITURE COMPARISONS.

A WHITE Paper has been recently issued dealing with the total naval expenditure of the United Kingdom and the other principal Powers in each of the last ten years. The gross totals of the various countries in the first and last years of the return compare as follow:—

	1904-5	1913-14
Great Britain....	£41,062,075	£47,021,636
United States....	20,180,310	29,498,867
Russia	11,949,906	24,249,454
Germany	10,105,000	23,039,184
France	12,382,433	20,847,763
Italy	5,000,000	10,157,846
Japan	2,102,548	9,860,812
Austria-Hungary	2,615,460	6,006,551

In the cases of Great Britain, the United States, Russia, Germany, France, and Japan, the totals this year are the highest recorded, while the figures for personnel are also the highest in the list with the exception of those of Russia, which, after being about 70,000 in 1904 and 1905, dropped below 45,000 in 1908, and are now 52,463. The British Navy numbers 146,000, the German 73,176, the United States 67,907, and the French 63,596 men.

In regard to new construction, there is in the cases of Great Britain, Germany and Austria-Hungary a decrease. Great Britain leads the way with a vote of £16,101,884 (representing 236,408 tons), Russia being second with £11,844,586, nearly double the 1912 figure. Germany has voted £11,010,883, and France £8,893,064, while the United States has made a big advance with £7,258,953, against £4,226,728 in 1912-13.

A Detachable Boat Motor—the Spencer, is now manufactured in Canada. This is of interest, as it is the only British production of its kind. The unique feature of this set is that it is of the four-stroke type, and is made in one and two cylinders. All other motors of this class are worked on the two-stroke principle, and are only made with one cylinder. The makers are H. W. Spencer & Co., Montreal.

NEW SIGNALLING APPARATUS.

MR. J. M. GOWAN, superintendent engineer of the C. P. R. coast steamship service, states that the C.P.R. is in communication with the manufacturers of a submarine marine bell signal, with a view to installing receiving apparatus on some of the coasting steamers plying in the company's service, in connection with the submarine bells installed at the Sandheads lightship and on the Spanish banks by the Department of Marine and Fisheries.

Although no definite arrangements have been made for the use of this apparatus, it is probable that it will be placed in the steamers plying between Vancouver and Victoria in the near future.

The recent rapid growth of this form of signalling is remarkable. A submarine bell does in thick weather what a light does in clear weather, by warning a ship where the danger is, in ample time to avoid it. The apparatus installed at the Sandheads consists of a submarine bell hung from a tripod set on the bottom of the sea and connected with the station on the lightship by means of a submarine cable, which rings the bell by means of electricity.

On each side of the ship installed with the receiving apparatus, near the bow and lying well below the water-line, attached to the skin of the vessel, is a small cast iron tank filled with water in which hang two microphones. Each microphone is electrically connected with an indicator box in the pilot house or chart room. The sound of the bell, coming through the water, passes through the skin of the ship, which acts as a diaphragm, enters the water in the tank and is picked up by the microphones, which in turn transmit it to the indicator box. Switches in the indicator box enable the observer to listen alternately to the sound picked up by the port and starboard microphones, and to determine by the loudness of the tone on which side the bell is ringing. In order to get the exact direction from which the sound is coming, the ship is swung toward the side on which the sound is louder and when it is equally loud on both sides, the ship is pointing directly at the bell.

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H. V. TYRRELL, Toronto - Business Manager
PETER BAIN, M.E., Toronto - Editor

OFFICES:

CANADA—
Montreal—Rooms 701-702 Eastern Townships Bank Building,
Telephone Main 1255.
Toronto—143-149 University Ave. Telephone Main 7324.
Winnipeg—34 Royal Bank Building. Phone Garry 2313.
Vancouver, B. C.—2649 Third Ave. West, H. Hodgson.

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New York—R. B. Huestis, 115 Broadway, New York,
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CANADIAN VICKERS SHIPYARD AT MONTREAL.

IN our present issue, considerable space is devoted editorially to the shipyard plant of the Canadian Vickers Company, at Montreal. Mention is made of the progress being made, and an outline sketch given of the projected capacity and final equipment and compass of the undertaking. We have been officially informed that within the next two years the whole establishment will be completed, and, needless to say, the addition to Canada's industrial sphere of such an enterprise will open up new opportunity and afford extended scope to those developing our natural resources, and to the many others who will find direct and indirect occupation through its instrumentality.

THE TRAGEDY OF OUR GREAT LAKES.

AS we go to press, there are still being unfolded the harrowing details of the greatest combination of disasters that has yet befallen the shipping on the Great Lakes of this Continent. Ranking, in recent years, perhaps next to the foundering of the Titanic, 18 months ago, in general importance, but taking premier place and making record so far as Canada is concerned, in the matter of the loss of brave men and things material, we think it meet that reference should be made in the columns of this journal to the overwhelming sorrow which has taken possession of all of us, and that our sympathy be extended to those bereaved, because of the untoward, and might we say unavoidable tragedy in which they have been made to participate. It were needless for us to recount in detail the present known losses of life and shipping as a result of the storm, save to remark that the former runs into hundreds and the latter to millions, reckoned in men and dollars respectively.

One effect of the overwhelming nature of the disaster has been, as is customary, to make occasion and opportunity for the expression of extravagant and ridiculous opinions, in spite of the fact that practically nothing is known of just what happened the ill-fated craft and their crews. Under any circumstances, it is easy to find someone blameworthy, and, in the present instance, there is no lack of shoulders on which to place the onus of the tragedy. Something might have been done to avert or minimize the awful effects as they have become unfolded, if, but there are times, yes very many times, when we are helpless.

We have been reminded, if not taught, a few things as a result of this series of disasters. Our lake freighters as they exist to-day are fair weather craft. They are a development whose ostensible purposes are to carry as much cargo per trip, and make as many trips per short season, on the most economical basis. It has never been seriously claimed for this type vessel that it need pit itself against the warring elements. To run for shelter did not place the master under the imputation of cowardice, neither did it condemn the shipbuilder for want of skill in determining strength of scantlings or for poor constructive ability. Sea room is a scarce commodity on our Great Lakes, and there is little option left to the master of such vessels caught suddenly in a hurricane, even without blinding snow or sleet. He may attempt to stand up to the fury of wind and sea, but he usually wages an unequal battle. His alternatives, if we might use the word, are therefore shore (wreck) or shelter.

In view of the tremendous risks taken by Great Lakes Shipping Companies, and the fact that the lives of men are involved, is it not opportune that ship-owners seriously consider and take steps to equip future vessels with propelling machinery more commensurate with their service. A ship like a boy or girl must be well found, and while the two latter, in the matter of good food and plenty, have strong healthy constitutions, which may be paralleled to a well built ship, we attach equal if not greater importance to the cultivation of head and heart for their holding their own in emergencies. The well-built ship must also have power adaptable to its every service exigency.

Carrying capacity should no longer dominate our Lake vessel design and construction, and the power feature be relegated to the background. Wrecks would be fewer, insurance would be less onerous, death and desolation would be combated, and brave men would avoid being accused of ignoring storm signals. Propelling power is the crying need of our Lake craft, and if this lesson is learned and put into practice as a result of this great tragedy, three hundred men will not have gone down to their death in vain.

MARINE NEWS FROM EVERY SOURCE

The Delta Dredging Co., with head office in Vancouver, has been incorporated with a capital of \$100,000.

Quebec, Que.—The transfer of the Quebec Steamship Co. to the R. and O. interests is expected to take place shortly.

Quebec, Que.—The tug S. J. O. Gravel has been sold to Miller Rodgers & Co., contractors, of Toronto, for \$50,000.

London, Ont.—Ald. Frank White and Fire Chief Aitken have been appointed a committee to purchase a steel boat for the fire department.

Thorold, Ont.—Thorold is now an ocean port. The steamship Glenfoyle unloaded a cargo of sulphite pulp at the Ontario Paper Cill dock here on the Welland Canal last month.

Ottawa, Ont.—The new ice breaker, for which tenders will be called in a few days by the Marine Department, will be the largest in the world. It will be used on the St. Lawrence.

Collingwood, Ont.—The new steamer for the Pelee Island mainland route will be launched in Collingwood in December. She will have a speed of 15 miles an hour and will cost \$70,000.

South Vancouver, B.C.—The council has voted \$1,000 towards making plans for the improvement of the North Arm, which work will cost the Dominion Government \$200,000.

Collingwood, Ont.—The Collingwood Shipbuilding Co. have secured the contract to build a large bulk freighter for the St. Lawrence and Chicago Steam Navigation Co.

Sault Ste. Marie, Ont.—The Company arranging to build a dry dock here, have deposited their \$25,000 guarantee. A by-law will be passed later to give the company a bonus of \$20,000 a year for 20 years.

Halifax, N.S.—Hon Robt. Rogers, Minister of Public Works, announces that the largest dry dock in the British Empire will be built on Halifax Harbor, probably on the Dartmouth side. He also states that he will give his support to the construction of a bridge across

the Narrows, connecting Halifax and Dartmouth.

Toronto, Ont.—Polson Iron Works have sent 25 men to Nelson, B.C., to erect the car float built by them for the C.P.R.

Brockville, Ont.—Further attempts to raise the steel steambarge Keystorm will not be made this fall. The wrecking crew have found that the spot where the Keystorm lies is one of the roughest in the river.

Lake Superior Dry-Dock and Construction Co., Ltd., incorporated at Toronto, capital \$1,000,000, to build, erect, construct, steamships, at Sault Ste. Marie. Incorporators: James S. Lovell, Robert Gowans, etc., Toronto.

Atlantic Coast Steamship Co., Ltd., incorporated at Ottawa, capital \$500,000 to build, equip, or otherwise acquire and hold ships and vessels, at Toronto. Incorporators: Reginald H. Parmenter, Arthur J. Thomson, etc., Toronto.

Charlottetown, P.E.I.—The schooner Flora T., on her way from Pugwash to Charlottetown, with a cargo of brick, foundered in Northumberland Strait, off Canoe Cove, and the two men on board went down with her.

Vancouver, B.C.—The design for a 15-inch hydraulic dredge for use on the Arrow Lakes, submitted by Cartwright, Matheson & Co., Vancouver, has been accepted by the Dominion Government. Tenders will be called soon for its construction.

Ottawa, Ont.—The first steamer of the Royal Mail Steam Packet fleet inaugurating the new fortnightly service between Canada and the British West Indies sailed from Halifax on November 23 for Georgetown, British Guiana, and West Indian ports.

Change in Lights.—The following notice posted by United States engineers is of great importance to up-bound vessels: "The lower or easterly end of the new centre pier, east approach, Poe lock, now in use, is marked by two red lights. This pier will be illuminated with oil lamps for the present, but these will be replaced by electric arc lights as soon as practicable. The lights marking the end of the north-east pier have been

discontinued, and the pier is being removed."

Vancouver, B.C.—The Merchants' and Shippers' Steamship Line announces that if a reciprocal trade arrangement is reached between Canada and Australia, as now proposed, it will put on a line of vessels between here and Sydney.

Windsor, Ont.—Captain Trotter and wrecking crew of steamer J. E. Mills, of Amherstburg, have succeeded in raising the construction scow which sank some time ago alongside the new Government dock in Windsor. The craft was hoisted up by derricks until it was possible to free her of water with steam pumps.

The Department of Marine and Fisheries, Ottawa, has issued a Steamboat Inspection Report, which contains a list of all steamboat trading on the Canadian lakes and seaboard, and subject to inspection up to March 31, 1912. The name of each vessel, where employed, tonnage, etc., is given.

Winnipeg, Man.—The Hudson Bay Co. announces an expenditure of \$20,000 on the development of the far north of Canada in preparation for the great expansion expected when the Hudson Bay Railway is completed in two years. This money will be spent on steel clad steamers on Hudson Bay, and chains of trading posts across Canada.

Montreal, Que.—The management of the Canadian Vickers Co. report that the foundations of the new shipbuilding slipway at the site of the floating ship-dock at Maisonneuve have been laid. The structural work for the slipway, which will be 390 feet wide over all, is now in process of construction at the works of the Dominion Bridge Co.

The Department of the Naval Service, Ottawa, has published a bulletin entitled "The currents at the entrance to the St. Lawrence." The bulletin contains the results of observations taken in recent years, principally during the seasons of 1911 and 1912, of the strength and direction of currents in the Gulf of St. Lawrence. Stations were established at various points, and the readings taken form the subject matter for four tables and a map, in addition to a description of the work accomplished.

Canadian Canal Traffic.—October statistics on Canada's Canals give the traffic total as 39,077,369 tons, which is 4,816,103 tons greater than in the same month of 1912. The increase at the Soo was 3,467,889, the Welland 673,359, and the St. Lawrence 744,835. The figures indicate that much traffic passing through the Canadian Soo reaches the seaboard via American routes.

Curling, Nfld.—The steamer *Alcona*, a floating refrigerator for the Gloucester boats engaged in the herring fisheries on this coast, sank in Curling Harbor Nov. 6, after it had been swept by flames for eighteen hours. All the crew of fourteen escaped, though several were thrown in the water when the steamer went down. The *Alcona* was valued at \$100,000.

Kingston, Ont. — On Nov. 14, the steamer *H. F. Packer*, which had discharged coal at the Locomotive Company's wharf, and was formerly owned by the Tonawanda Iron and Steel Co., of Buffalo, N.Y., was changed from United States to Canadian registration. She has been bought by Cobourg parties. J. W. Goodroch was the master of the vessel.

Welland, Ont.—M. Beatty & Sons have been awarded the contract to build a large dipper dredge for the C. S. Boone Dredging and Construction Co. of Toronto. The dredge, when completed, will be used on the excavation work of the new Welland Canal. It will be of five yard capacity, 100 feet long, 50 feet wide, and ten feet in depth, and will be of steel construction.

Sydney, N.S.—There is now practically no doubt that the steamer *Bridgeport*, belonging to the Dominion Coal Co. missing since November 1st, has become a victim of the elements. Government boats have scoured the Gulf in search of her, but with the exception of a piece of floating wreckage, which could not at the time be identified as being part of the collier, no trace has been found of the missing ship.

Record Canal Traffic.—Canadian canal traffic in the season now closing has broken all records. From the opening of the canals, the increase in the volume of traffic has been steadily sustained. Up to November 1, a total of 46,428,283 tons was handled, this being an increase of 4,845,171 over the corresponding period. Of this total increase, the Soo Canal contributed 3,384,714 tons; the Welland canal 729,477, and the St. Lawrence, 831,569. The difference between the Soo and Welland figures indicate a large volume of Canadian traffic, finding an outlet by way of United States' ports.

Fort William, Ont.—In the opinion of marine men, Fort William harbor will remain open for navigation all winter. Ice-breakers and ice-breaking tugs constitute a fleet unequalled in any other part of the Dominion, and will be employed in keeping the harbor free of ice.

Collingwood, Ont.—According to A. A. Wright, general manager of the St. Lawrence and Chicago Steam Navigation Co., the new sister ship to the ill fated *James Carruthers*, which was lost on Lake Huron recently, should be ready to be placed in commission in time for the grain-carrying trade next autumn. The loss of the *Carruthers* is covered by insurance to the extent of \$275,000 with the underwriters, and \$150,000 in the insurance fund of the Company.

C.P.R. Steamship Services. — The Canadian Pacific Steamship Lines announced officially on October 24, that T. McNeil, at present Antwerp agent for the company, will succeed to the position of Liverpool agent, left vacant by the death of F. W. Forester. Mr. McNeil has had a lifetime experience in maritime matters, having been employed by the Manchester Line for several years before his connection with the C.P.R. W. D. Grosset, for years Chief Assistant in the general European offices in London, has been selected to fill Mr. McNeil's post at Antwerp.

Canadian Vickers, Ltd.—The *Journal of Commerce* (British), makes the following significant statement in a recent issue:—

Satisfactory progress is reported in connection with the amalgamation of important navigation companies running on the Great Canadian Lakes, two British firms financially interested in the new combine being *Vickers, Ltd.*, of Barrow, and *Furness, Withy & Co.*, of West Hartlepool. The former are also credited with the intention of opening an establishment at Sault Ste. Marie, a convenient point between Lake Superior and Lake Michigan, so that their connections with the whole Dominion will soon be of great magnitude.

New Island Discovered.—Interest is manifested in the report from Halifax that Captain Anderson, of the *Lizzie Giffin*, a Gloucester fishing vessel, has sighted a new island approximately fifteen miles east of Sable Island and near the track of Transatlantic steamships. The new land might be the result of an earthquake. On the chart, the position given by Captain Anderson shows a normal depth of thirty fathoms. The U.S. Navy Department may send a survey boat out to investigate the captain's

report. The Canadian Government is also making an investigation.

Port Arthur, Ont.—A party of officials of the Northern Navigation Co., were in the city, to inspect the steamer *Noronic* which is nearing completion at the yards of the Western Dry Dock and Ship Building Co. The party consisted of Messrs. Patton, Gildersleeve, Playfair, Carruthers, Whalen, Towers, Cross, Dyer, Sturdy, McEown, Calderwood, Mr. and Mrs. Ray, Mrs. McGibbon, Mr. Morrison. Mr. Cross is chief draughtsman for the American Shipbuilding Co., with headquarters at Cleveland. Mr. Dyer is the architect for the *Noronic*, and Mr. Sturdy has the contract for the decorating of the new ship.

New Wireless Stations.—J. H. Lauer, manager of the Marconi Wireless Co., of Canada, announced recently that his company had been awarded a contract for the installation of wireless telegraph stations at Kingston, Toronto and Port Burwell, by the Department of Naval Service. These three new stations will complete the chain of eight stations on the Great Lakes, constructed by the Marconi Company, all of which will be operated by them, by means of apparatus of the latest type, capable of a normal working range of 300 miles under all conditions.

In addition to the eight stations operated by the Canadian Co., the affiliated American Co. operates stations at Buffalo, Cleveland, Detroit, Ashtabula, Benton Harbor, Calumet, Duluth, Grand Haven, Grandmarais and Isle Royale. The two companies also operate wireless telegraphy on about 100 vessels on the Great Lakes.

Fishery Cruiser Galiano.—On October 18 the Dublin Dockyard Co. launched the second of the two fishery cruisers, the *Galiano*, which were ordered from them by the Canadian Government, for the protection of fisheries on the Pacific Coast, and for hydrographical purposes. The vessel is a duplicate of the *Malaspina*, described in our October issue, and now on her way to Esquimalt, B.C., which is the base from which the vessels will operate. The dimensions of the vessels, which have been built to the highest class in Lloyd's register, are: Length between perpendiculars, 162 ft.; breadth moulded, 27 ft.; and depth moulded, 13 ft. 11 in. The machinery is being supplied by David Rowan & Co., Glasgow, and the vessels will have a speed at sea under working conditions of 14¾ knots. A Cochran donkey boiler, fitted with patent seamless furnace, has been installed on the *Galiano*. The two vessels have been built under the superintendence of R. L. Newman, of Montreal, con-

sulting naval architect to the Canadian Government, and F. L. Warren, of London.

Montreal Inland Revenue.—As was the case during September, while the Customs returns have declined, inland revenue shows a surplus for the past month over that received during October, 1912. This surplus amounts to \$19,263.33, the detailed figures being \$964,722.66 for October, 1913, as compared with \$945,459.43 for October, 1912.

Montreal Port Customs Revenue.—There has been another marked decline in the Customs revenue of the port for the month of October, the decrease from the total revenue received during October, 1912, being \$202,222. The returns for the past month amounted to \$2,146,781.99, as compared with \$2,349,003.99 for October, 1912. There is, however, still a considerable surplus for the present fiscal year, which commenced on April 1, compared with the similar period of 1912, the surplus of this year over last, to date, amounting to quite \$800,000.

Allan Line and Quebec.—Mr. Andrew A. Allan was quoted as follows in the report of an interview given to a representative of one of the Quebec newspapers recently: "It is practically certain that Quebec will not be the terminal for the new Allan liners Alsatian and Calgarian, now building. Even with Quebec as a port of call only, we are having trouble with the handling of the cargo. There are at present in Quebec two organizations—the Longshoremen's Union and the Ship Laborers' Association, whose demands on Steamship Companies with regard to wages and hours of working, not to mention the manner in which the work is done, would be a material hindrance to making Quebec a terminal port. The cost of handling freight in Quebec is high, far higher than in Montreal, where the average weekly wage runs about \$18. Some weeks, however, when a large amount of work is got through, the pay runs as high as \$30."

Montreal Port Statistics.—Arrivals of ocean liners in the port during October numbered 59 only, which is less by three than the two a day which is considered an average arrival list. At the same time, the arrivals during the past month were six more than for October last year. During October, Allan liners numbered 12, Canada liners 3, C.P.R. 8, Cunard 3, Direct 1, Dominion 3, Donaldson 4, Elder-Dempster 1, Furness 4, Head 3, Manchester 3, New Zealand 1, Royal 2, and White Star liners 4. There were besides three tramp steamers. The following is a comparison of this season

to date with the corresponding period of last year: From the opening of navigation until May 31 inclusive, 76, as compared with 73 last year; for June, 81, as against 54; July, 72 against 62; August, 72 against 56; September, 65 against 57; and October 59 against 53. The total number of ocean liners which have arrived this year to date is 425, as compared with 355 for the corresponding period of last year, an increase of 70.

Hudson Bay Wreck.—The Department of Marine and Fisheries has been advised that the steamer Alette, with a valuable cargo of lumber on board, intended for use at the Port Nelson terminals, was beached along the west shore of Hudson Bay, some miles north of Port Nelson. The steamer, after spending several months at the port in a vain endeavor to unload her cargo, was returning to Halifax for the winter. The stress of weather and the fact that she was damaged by drifting on shoals near the harbor during the summer, made her unseaworthy for the return voyage. After getting some two hundred miles out, she was found to be leaking so badly that a return to Port Nelson was attempted. Before reaching the port again she was beached. An attempt will be made to salvage at least some of the cargo, but the loss will in any case be large. This is the second wreck under Government auspices in Hudson Bay this year, the first wreck being the steamer Cearense last August. In addition to these losses, the steamer Alcazar was obliged to return to Sydney, C.B., with 1,500,000 feet of lumber carried to Port Nelson from Port Arthur, Texas, and then brought back to Sydney owing to the lack of unloading facilities at Port Nelson.

RECORD SHIPBUILDING YEAR ON CLYDE.

THE output of 71,500 tons from the Clyde shipbuilding yards during the month of October establishes two new records, and practically assures that the aggregate figures for 1913 will exceed anything previously recorded. The total for the ten months has been raised to 560,000 tons, being 40,000 tons over that of the corresponding period of last year, which was the previous best. The bumper figures of October are due primarily to the launching of an unusually large number of liners, which will constitute the outstanding feature of the Clyde shipbuilding trade for the current year. Those figures are regarded as setting aside any doubt that may have been entertained as to the year establishing a new record.

Not only has the output been on a re-

cord scale, but there has been an improvement in the booking of new work, thanks principally to the further reduction in the price of steel material. Ship and boiler plates and other material have been thrice reduced by \$2.50 per ton since the beginning of August, bringing quotations down to a level which permits of the tendering for new hulls on terms more in consonance with the views of shipowners. Accordingly, with the work still on the stocks and the new contracts booked, the Clyde shipbuilding yards are assured of a fair degree of activity well into next year. That is always provided, of course, that calculations are not upset by labor troubles, which never seem very far away. At the moment there seems no danger of a serious breach, but the small local questions which are continually cropping up have an irritating way of retarding work at the various shipyards and undoubtedly find their reflection not only in the shipbuilders' profits, but in the output from month to month.

It is noteworthy that the half-million ton level for the ten months has only been exceeded four times, namely, in 1906, 1907, 1912, and 1913, while it is only twelve years since the total for the completed year exceeded that figure.

COLLIDED WITH ICEBERG.

LISTING heavily to port, and with her bow crushed in as far as the forward bulkhead, as the result of a collision with an iceberg, the Manchester liner "Manchester Commerce" crept into St. John, Nfld. harbor on Nov. 4.

She was bound from Montreal for Manchester under command of Captain Couch and struck the berg head on about 100 miles east of Belle Isle at 2 a.m., Nov. 2. The night was very dark, and the berg loomed out of the blackness so suddenly that there was no time to change the course of the steamer, which crashed at full speed into the ice. The steel prow of the liner was crumpled up like a piece of tin as far aft as the collision bulkhead, and the decks were covered with fragments of ice from the berg.

Captain Couch made a hasty survey of the damage, notified his agents at Montreal of the accident and headed his ship for St. John's.

The steamer carried about 6,000 tons of general cargo. Her lower hold, above which the water did not come, was filled with timber, while the grain, flour and other foodstuffs were on the deck above. The repairs to the steamer will require about two months. The "Manchester Commerce" carries a crew of about 40 officers and men.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Robert Reford, of Montreal, the well-known shipowner who died March 15 last, left an estate of \$2,912,486.

T. McNeil, the C.P.R. Antwerp agent, will succeed the late F. W. Forster as Liverpool agent. Mr. McNeil's successor will be W. O. Grosset.

Superintendent Sullivan, of the Welland Canal, has been appointed assistant to Chief Engineer Weller. His post as head of the present canal will be filled by L. N. Hara, of St. Catharines.

Thomas Cullen, a retired Newfoundland sea captain, over 70 years of age, who for many years has made his residence in Montreal, died at his home, 76 St. Matthew Street, on October 29.

Alexander Blakely, master mariner of Golden, B.C., was drowned on Oct. 21 from a canoe, while near his ship the "Invermere" at a point 12 miles from Golden, while piloting up the Columbia river.

V. F. W. Forneret, superintending engineer of the St. Lawrence Ship Channel, was asked recently whether he expected to keep the channel open between Quebec and Three Rivers during the winter. Mr. Forneret was doubtful whether this could be done until the new ice-breaker is finished, if the weather conditions are severe. A mild winter, however, would materially help matters.

Capt. Neil Campbell, a well-known Owen Sound mariner, has lost his American master's papers, because he insisted on making his home in Owen Sound, instead of removing his family to the States. He was also declared a citizen of Canada by the naturalization office, although he had years ago taken out the necessary papers making him a citizen of the United States.

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William Street, Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy Street, Kingston, Ont.; Capt. James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

Huntley Drummond, Montreal, has been suggested as a member of the Government Commission which will be appointed to inquire into the economic feasibility of the Georgian Bay Canal, as distinguished from its engineering features. His selection is highly probable if he will accept.

James McNab, an old master mariner, who had served on both sailing vessels and steamers, died at Collingwood, Ont., on November 16. Captain McNab was in charge of one of Lord Wolseley's boats in the Red River Expedition. He had been latterly keeper of Nottawasaga lighthouse, three miles outside Collingwood harbor.

Captain Harwood, of the oil tank steamer Narragansett, whose vessel assisted at the rescue of the *Volturno's* passengers, has made an interesting statement with regard to the use of oil. He said he kept the pumps going under the stern of the *Volturno* for an hour and fifty minutes, and did not think he poured out more than about 50 tons of lubricating oil through two 4-inch hoses. The effect was marvellous, for he, ten minutes afterwards, launched two boats, the first coming back in 49 minutes with 21 passengers and the second ten minutes later with eight more.

ASSOCIATIONS

DOMINION MARINE ASSOCIATION.

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GREAT LAKES AND ST. LAWRENCE RIVER RATE COMMITTEE.

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INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.

President—A. A. Heard, Albany, N.Y. Secretary—M. R. Nelson, New York. . . .

THE SHIPPING FEDERATION OF CANADA

President—A. A. Allan, Montreal; Manager and Secretary—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.

Grand Master—Capt. J. H. McMaugh, Toronto, Ont.; Grand Secretary-Treasurer—Capt. H. O. Jackson, 376 Huron St., Toronto.

GRAND COUNCIL, N.A.M.E. GRAND OFFICERS.

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Thos. Theriault, Levis, P.Q., Grand Vice-President.
Neil J. Morrison, P.O. Box 238, St. John, N.B., Grand Secretary-Treasurer.
Jno. A. Murphy, Midland, Ont., Grand Conductor.
George Bourret, Sorel, P.Q., Grand Door-keeper.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

SCOWS FOR QUEBEC HARBOR COMMISSION.

THE Quebec Harbor Commission are having built at the Polson Iron Works, Toronto, six steel dump scows; three with a capacity of 500 cubic yards, and three with a capacity of 300 cubic yards. They will be built entirely of steel, with square bilges; the hull plating being connected by steel castings. The overall dimensions of the 500 yard scows are 144 feet long by 31 feet wide by 11 ft. 6 inches in depth. The 300

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto,	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John,	2	H. E. Berry,		G. T. G. Blewett,	36 Murray Street, St. John, N.B.
Collingwood,	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston,	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex. McNivern,	P. O. Box 234.	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	Andrew T. Roy,	1212 Burrard St.,	E. Read,	859 Thurlow St.
Levis,	8	Helaire Mercier,	3 St. Joseph St.	S. G. Guenard,	Laizon, Levis, P.Q.
Sorel,	9	Geo. Gendron,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	W. Robertson,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor,	11	Alex. McDonald,	28 Crawford Ave,	Nell Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,		Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault St. Marie,	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown,	15	J. F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottetown, P.E.I.
Twin City,	16	Arthur Abbey	Fort William, Ont.	John A. Smith,	Fort William, Ont.

yards scows are 108 feet long by 28 feet wide by 11 feet deep.

The hoppers are divided into pockets, and the sides have water-tight compartments formed by transverse bulkheads. In the 500 yard scows, the hoppers are divided into 7 pockets, each being 16 ft. long by 9 ft. 3-in. deep by 21 ft. wide at the deck. They have, on each side, 9 w.t. compartments with 7 bulkheads. The 300 yard scows have 5 pockets, each 16 ft. long by 8 ft. 6 in. deep by 19 ft. wide at deck. They have on each side 7 w.t. compartments with 5 bulkheads. In all cases the depth from pocket combing to deck is 2 feet with a deck chamber of 6 inches. In the 500 yard scows the discharge doors in each pocket are operated by a steam driven worm gear, while the 300 yard scows are equipped with a hand operated worm gear.

FINES OR SUSPENSION.

THE reinstatement of Pilot Lachance, whose license was suspended from August 14 last until the end of the present season, in connection with the stranding of the Lake Manitoba on July 29, has been a topic of general conversation in shipping circles recently. The reason given by the Marine Department for the reinstatement, that

temporary suspension tends to unfit a pilot for the performance of his duties when his license is restored, was allowed to be a good one, but it was pointed out that some penalty for careless navigation is necessary, and also that no favoritism should be shown, but that if Pilot Lachance is to be restored, then Pilot Delisle, who was suspended for allowing the Whakatane to strand, should be reinstated also.

At the offices of the Harbor Commission, it was recalled that, at the time when the control of the pilots was taken from the Commission, the ten commissioners were framing a scheme for fining careless pilots who met with accidents, and in such a way that they would be constantly reminded of their error for some time afterwards.

It was not proposed that they be fined a lump sum, which might be paid at once and then forgotten, but that a percentage of their earnings, the amount of the percentage to be graduated according to the gravity of the offence, should be deducted from their fees for each ship they piloted for a period to be determined by those whose duty it was to investigate the accident. Some shipping men advocate that the post of Wreck Commissioner should be held independently of the Marine and Fisheries

Department, and that he should be an official of the Department of Justice, instead, and that the Marine Department should not have power to revise his decision.

VESSEL OWNERS OPPOSE LA FOLLETTE BILL.

REPRESENTATIVES of forty lake passenger steamer companies held an all-day session in Cleveland on October 29, organizing to oppose the La Follette Seamen's Bill now pending in Congress. Some of the provisions of the bill, they say, cannot be complied with, and for lake steamers, which are never more than half an hour's sailing from land, some of the provisions are unreasonable.

The vessel owners favor a bill that with regard to the qualifications of an able seaman, shall be even more strict than the La Follette bill, which demands three years' service before the issuance of a certificate. The present plan of issuing certificates, they say, allows them to fall sometimes into the hands of seamen not fully qualified.

Plans for a delegation of the ship-owners to go to Washington to oppose the bill will be made at another meeting to be held soon. A committee was appointed to arrange the time and place.

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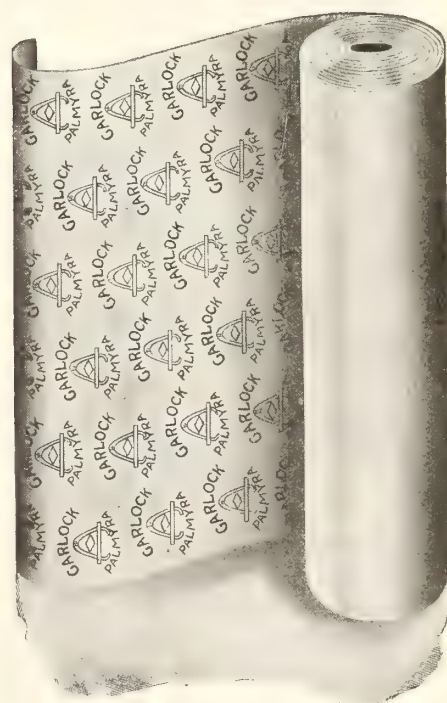
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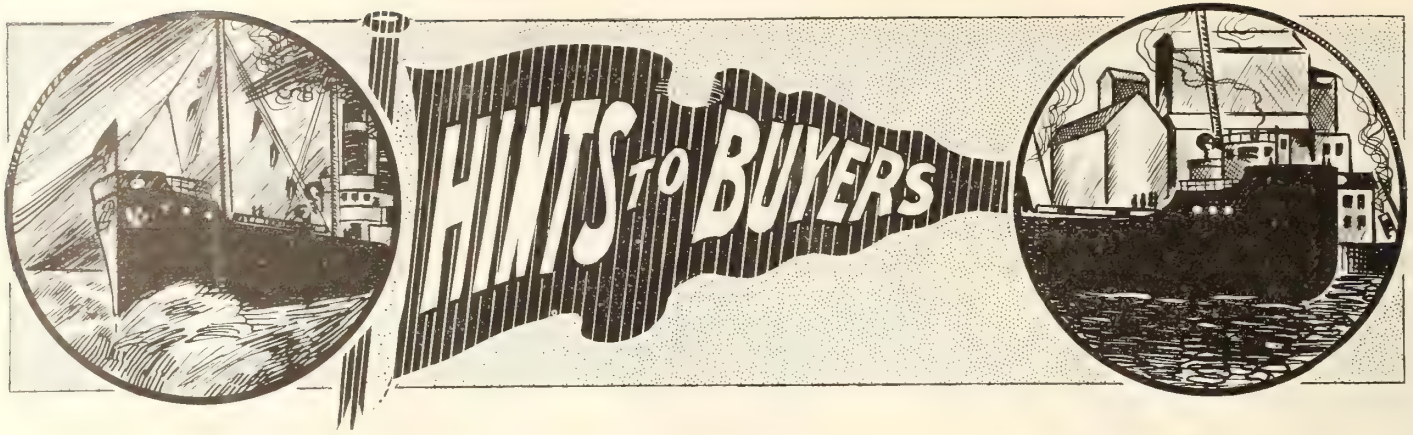
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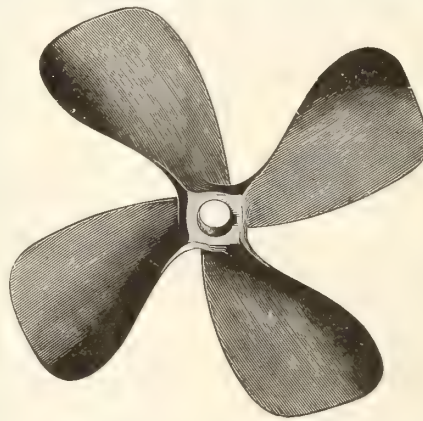
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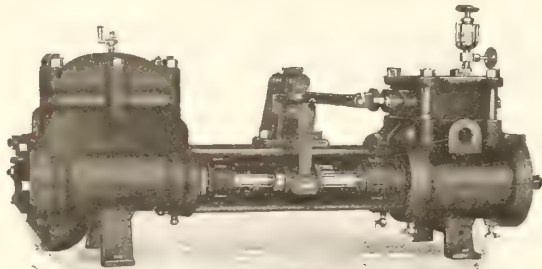
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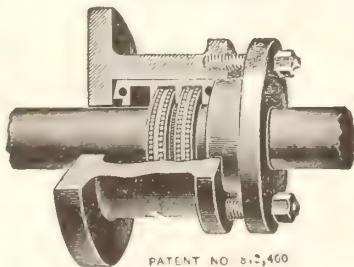
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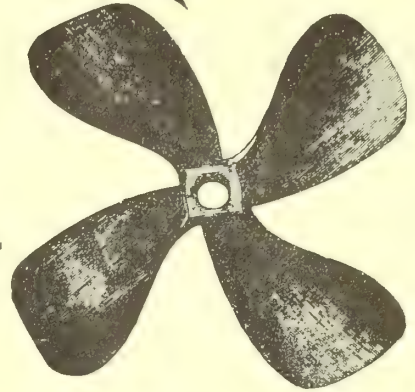
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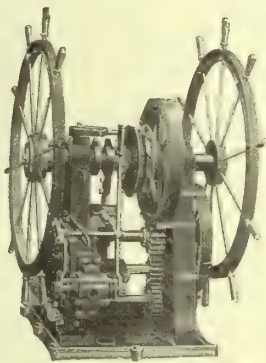


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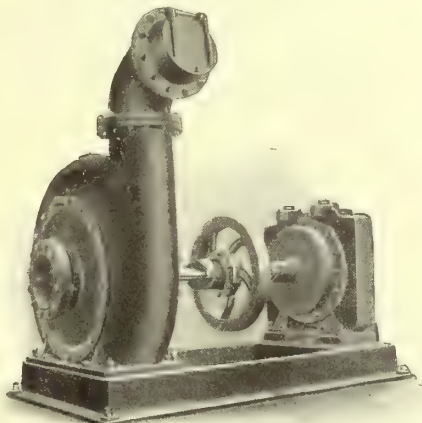


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Vol. III.

Publication Office, Toronto—December, 1913

No. 12



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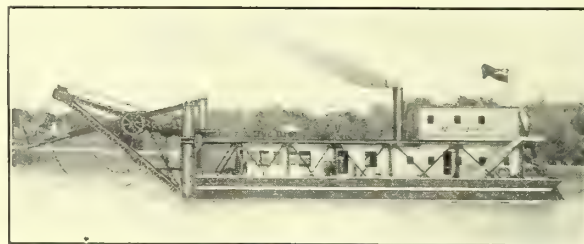
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Let us figure on your requirements.

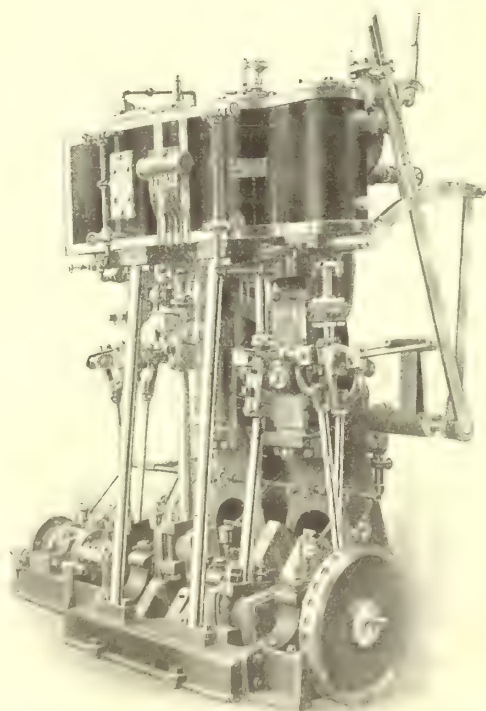
We have the experience necessary to build anything you need in this line and you will find our prices right.

Send for descriptive matter now.

M. BEATTY & SONS, Limited

WELLAND

ONTARIO



This is one of our Compound Jet Condensing Engines with Pumps and Thrust attached.

The Doty Marine Engine & Boiler Co. LIMITED

Builders of High Grade

Marine Engines and Boilers

Compound Jet Condensing Engines

Compound Surface Condensing Engines

Triple Expansion Engines

Non-Condensing Stern Wheel Engines

Tandem Compound Stern Wheel Engines

Marine Boilers of various types including Scotch, Locomotive, Fitzgibbon, Fire-box Return Tubular and Safety Water Tube.

Estimates furnished for complete Marine outfits.

The Doty Marine Engine & Boiler Co.

LIMITED

GODERICH,

CANADA

The advertiser would like to know where you saw his advertisement—tell him.

Some Advertising Advice.

¶ To make your advertising help your business, you must make it your business to help your advertising.

¶ Fancy a salesman calling on a very busy man once a week for a year, and saying exactly the same thing, wearing the same clothes and the same expression. Wouldn't he stand a fat chance of doing business? And yet there are men who will condemn advertising because it can't produce results under conditions which would be absolutely intolerable in the human salesman.

¶ You may not have the artistic ability to plan attractive layouts for your advertisements—few business men have — but you can say something about your line that no other man can say. Something that rings true, something convincing—something that will sell.

¶ Leave the planning of your ad. to our service department. Tell us what you want to say and put it up to our ad-writing department to dress it up for the occasion—effectively.

¶ Our ad-planning-writing service is second to none in Canada, and many of our most successful advertisers are taking advantage of it. Its services are free, and every advertiser or prospective advertiser in this publication is invited to employ its help.

¶ Remember this—cold type and illustration are representing your product — your house—your service. If the illustrations are poor, if your message is weak, the type arrangement unattractive, a poor impression is received by the readers of your advertisement. On the other hand, good illustrations, good copy and a good layout give a good impression.

¶ You can't afford to allow a poor advertisement to represent you, when our Service Department stands ready to help you.

¶ If you want your advertising to make good, you've got to make it good.

¶ And it **will** make good in The Power House if you'll do your share. **We're** prepared to do **ours**.

Rate Card and Full Information Gladly Furnished on Request.

MARINE ENGINEERING of Canada

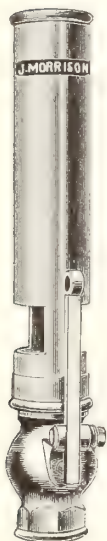
A monthly journal dealing with the progress and development of the Merchant and Naval Marine Engineering, Shipbuilding, the building of Harbors and Docks etc.

143 University Avenue, TORONTO

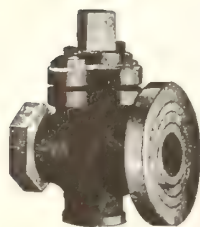
The advertiser would like to know where you saw his advertisement—tell him.



J.M.T. Swing Check Valve.



Steam Whistle
1 in. to 14 in. diam.
Various designs.



Marine Stop Cock.
Made Screwed or
Flanged.



A Good Service Record Stands Behind Our Engineers' Supplies, Brass Goods, Etc.

That our goods stand the test and last,
has been proven by many years of strain
and abnormal conditions.

The quality of our lines and correct-
ness of design are what spell efficiency
and reliability.

It will be to the interest of every mar-
ine man to see that our lines are specified
when alterations or repairs are being
made.

Your enquiries will receive our
prompt and careful attention.

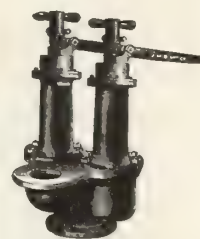
Write !

*To all our friends and customers we
extend our heartiest wishes for a safe and
prosperous New Year.*

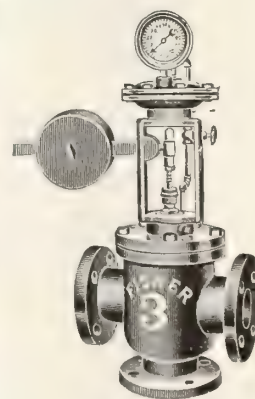
The James Morrison Brass Mfg. Co., Ltd.
93-97 Adelaide Street West, Toronto



J.M.T. Globe Valve
Renewable Disc.



Marine Safety Valve.



Reducing Pressure
Valve.



The advertiser would like to know where you saw his advertisement—tell him.

Twenty Years Progress in Vessel Design and Construction--II*

by Alexander Gracie, M.V.O.**

The author in his lecture deals in a racy, yet interesting manner with the development which has marked the combination subjects of marine engineering and shipbuilding, and leaves the reader with the impression that, notwithstanding the great strides made in recent years, and an evident tendency in some quarters to call a halt, there is progress, and achievement equal in degree, looming up in the near future, which will just as far eclipse present accomplishment, as the latter surpassed that of 20 years ago.

NO less interesting than vessels of the "liner" class are those smaller passenger carriers known as "cross-Channel steamers." Between different ports in the United Kingdom and between British and continental ports there has always been a large passenger traffic, and the competition between the various railway and other companies has developed a large fleet of small vessels whose speeds vie with those of Atlantic liners and whose speed-length ratios are greatly in excess of "liner" practice.

The conditions of these cross-Channel services differ materially from those of the liner routes. The distances are much shorter, ranging from 21 to 120 miles only, and the number of times the vessels enter harbor is much greater. The amount of fuel which must be carried is therefore much less, and economy of consumption is relatively of less importance. It is of greater importance to keep down tonnage, to save dues, and to reduce weight wherever possible in order to obtain high speeds upon small dimensions. Very few of the vessels are classed, and the scantling in all cases are kept as low as possible. In many cases, harbor accommodation imposes severe restrictions upon length and draught.

Development of the Cross Channel Steamship.

At the beginning of our twenty-year period, the majority of these vessels

indicated horse-power per ton—and she carried 103 tons of coal. The following are her percentage weights:—

Hull	48
Machinery	39
Coal	6
Passengers, stores and water..	7
	100

Her accommodation consisted of two deck state rooms, furnished with sofas only, and large open saloons below deck. She carried 580 first-class and 300 second-class day passengers.

The Ibex, of 1,062 gross tons, measured 265 feet by 32½ feet by 15½ feet, and with 4,200 indicated horse power realized a speed of 19.37 knots, the speed length ratio being 1.19. Her machinery developed 10¼ indicated horse-power per ton, and her percentage weights were as follows:—

Hull	60
Machinery	30
Coal	4½
Passengers, stores and water.	5½
	100

Her accommodation consisted of ten private cabins and a number of open saloons with sleeping accommodation on sofa berths. She carried 292 first-class and 265 second-class day passengers.

Other notable vessels of this period were:—

1901 and 1902, for service on the Firth of Clyde, the first turbine Channel steamer, the Queen, was placed on the Dover-Calais route. This notable vessel, 310 feet by 40 feet by 25 feet, of 1,676 gross tons, has turbine machinery of about 8,500 horse-power and attained a speed of 21.8 knots, equal to 1.24 times the square root of her length. In the same year the turbine steamer Brighton, 274 feet in length, steamed 21.37 knots, giving a speed-length ratio of 1.29. The success of these two vessels led to a rapid development of turbine propulsion, and the almost total abandonment of paddles and twin screws in the Channel services. In 1905 the Princess Elizabeth, with turbines and water-tube boilers made 24 knots on 375 feet, and the Dieppe, with turbines and cylindrical boilers and classed at Lloyd's brought the speed-length ratio up to 1.31, with 21.65 knots and a length of 274 feet.

To attain high speeds in relation to length, saving of weight is of vital importance, and the advantages of water-tube boilers in this respect are considerable, and all that prevented their more general adoption was their lack of robustness and the greater care and skill required in handling them, as compared with the well-trying and well-known Scotch type of steam raiser. By their use in the turbine steamer Newhaven, built in 1910 as successor to the Dieppe, a trial speed of 23.85 knots was obtained on a length of 292 feet, the speed-length ratio being raised to 1.4. This result was made possible by the extreme lightness of the machinery installation in relation to the power developed, 13,000 horse-power being obtained from a weight of only 590 tons, a rate of 22 shaft horse-power per ton, being about 2½ times that obtainable from paddle machinery and double the output of twin-screw engines. The whole displacement of the Newhaven was only 1,510 tons, or about 200 tons only in excess of that of the Dieppe, although the later vessel was 18 feet longer and twice as powerful.

Geared Turbines.

The outstanding difficulty in applying the steam turbine to marine propulsion has always been that while high speed of rotation is necessary to obtain the

Name.	Machinery.	Length.	Tonnage.	Speed.	Speed-length ratio.
Princesse Henriette	Paddle	300	1100	20.50	1.18
Leopole II.	"	340	1367	22.00	1.19
Princess May	"	280	1123	20.00	1.19
Tamise	Twin-screw	269	892	21.35	1.30
Frederica	"	265	1059	19.50	1.20

were paddle steamers. These were gradually replaced by twin-screw steamers, and these again were superseded by turbine-propelled craft which to-day are practically universal in the Channel services. Typical vessels in 1893 were the paddle steamer Calais Douvres and the twin screw Ibex. The Calais Douvres was 324 feet. in length, 36 feet in breadth and 14 feet deep. She was of 1,065 gross tons and 6,000 indicated horse power, and had a speed of 20.64 knots, with a speed-length ratio of 1.15. She was unclassified, her hull weighing 805 tons, her machinery 650 tons—9¼

During the succeeding ten years many other similar vessels were put into service, their length ranging from about 270 feet up to 300 feet in length, and their speeds from 19 to 24 knots. The most remarkable of these were perhaps the four-screw steamers Connaught, Leinster, Munster and Ulster, which on a length of 360 feet, attained a speed of 24¼ knots, a speed-length ratio of 1.28, and the Empress Queen, still the largest paddle vessel in this country, 360 feet in length and of 21¼ knots speed.

First Turbine Channel Steamer.

In 1903, encouraged by the success of the turbine steamers King Edward and Queen Alexandra, built respectively in

*James Forrest Lecture.
**Managing Director, Fairfield Shipbuilding and Engineering Co., Glasgow.

maximum turbine efficiency, the propellers are most efficient at very much lower speeds. Electric, hydraulic and gear wheel transmission have each been tried in order to combine a high-speed turbine with a slow-running propeller, and so obtain the maximum efficiency of each. Where a suitable gear-ratio can be adopted, not only can improved propeller efficiency and decreased consumption of steam per unit of power developed be obtained, but it is possible, by over-speeding the turbines at full power, to maintain the economy over a larger range of the ship's speed than could be done with a direct-coupled turbine. With the last-mentioned method of speed reduction, that of gear wheel transmission, a considerable amount of experience has now been obtained, and, up to the present, two small cargo vessels and seven cross-Channel steamers have been put on service, while four sets of about 12,000 horse-power each are at present under construction, two for ocean liners and two for swift coasters.

In 1911 the Channel steamers *Normannia* and *Hantonia* were each fitted with four turbines, two running at 2,000 and two at 1,400 revolutions, and connected by means of toothbed wheel gearing to two propeller shafts running at 310 revolutions per minute. The experiment was a notable success, the coal per trip being only 43 tons, as compared with the 70 tons used by their immediate predecessors, which were of the same capacity, but propelled by direct-driven three-screw turbines. Last summer the Channel steamer *Paris*, 293½ feet in length and having geared turbine propulsion, attained the remarkable speed of 25.07 knots on a run from Newhaven to Dieppe, the speed-length ratio working out at 1.47—a result which has only been surpassed by torpedo craft.

The introduction of toothed gearing for the main drive has been looked upon by many as a retrograde step. The conditions are, however, in no way similar to those in which formerly gearing up was necessary, and where a very variable turning moment in the reciprocating engine had to be contended with. The loss in transmission is small, being probably not more than 2 per cent. of the power transmitted, and the wear on the teeth is inappreciable. Some objection has been raised to the noise caused by the gearing, but, although doubtless not so silent as the direct-driven turbine, yet the geared turbine installation can be compared favorably with the reciprocating engine in this respect. The actual vibration transmitted through the structure of the ship is inappreciable; the effect of the gearing being felt altogether in an air vibration in the engine-room itself, and this will be reduced to a minimum with the more accurate

methods of gear cutting recently introduced. The large speed reduction which can be used makes the system suitable for ships of low speed and moderate power, and it is almost certain that this method will greatly extend the usefulness of the steam turbine for marine propulsion.

Hydraulic Transmission.

In Germany the hydraulic transmitter invented by Dr. Föttinger has lately been introduced. The principle of the transmitter is that of combining a high-speed turbo-centrifugal pump with a water turbine designed for a lower speed of revolution. The former is coupled direct to the steam turbine, and the latter to the propeller shaft, the pump and water turbine being placed in one casing and so designed that the frictional and eddy losses are reduced as far as possible. Some small transmitters have been fitted for marine purposes, and lately a transmitter has been tested with a load of 10,000 shaft horse-power, and it is proposed to fit a large German vessel with the system. A transmission efficiency of about 90 per cent. is claimed at full load, with a slight reduction at light loads. The ratio of primary to secondary speed is normally about 5.1, but transmitters could be designed for larger ratios.

Electrical Transmission.

Electrical transmission has now been applied to several vessels. Alternative schemes have been tried in which the power is generated by steam turbo-generators, or by generators of the Diesel oil engine type, and applied to the propeller by alternating current motors. Considering the transmission efficiencies likely to be attained and the increased weight and initial cost of the installation, it does not appear probable that a system of this kind will be able to compete successfully, in ordinary cases, with the direct-driving engine or mechanically geared turbine. Where, however, power has to be provided for other than propelling purposes—in which case the same generating plant could be available—it is possible that this system would have advantages.

The Purely Cargo Vessel.

Within the period under review vessels built solely for the purpose of carrying cargo have undergone notable development. The principal object of the owner of such vessels is to secure improved economy in each successive addition to his fleet, speed and accommodation being secondary considerations. And here again I have the same story to tell—the story of increase in dimensions and of reduction in fuel consumption in relation to work done. The following table shows the steady advance in the

vessels of one well-known line of cargo tramps:—

Year.	Tons.
1895	6,400
1899	7,200
1905	8,200
1912	9,300
1913	9,600

The speed has remained practically constant at 11 knots, but while the 6,400-ton deadweight carrier of 1895 developed 1,400 indicated horse-power and consumed 24 tons of coal daily, her successor of to-day can carry 9,600 tons and steam at the same speed on an expenditure of only 32 tons daily for 2,300 indicated horse-power. Fifty per cent. more deadweight is carried and 64 per cent. more power developed, but only 33 per cent. has been added to the coal account. The coal rate has fallen from 1.6 lb. per horse-power per hour to 1.3 lb., while, for a 3,000-mile voyage, the deadweight carried per ton of coal has increased from 23.5 tons to 26.4 tons.

Loading and Discharging Cargo.

Rapid loading and discharge of cargo are of vital importance to the tramp vessel, and it is evident that the less the cargo has to be moved horizontally along holds and 'tween decks before coming under the hatchways to be lifted, the more rapidly can it be handled. Hatches have therefore increased greatly in size, and in some vessels are now almost continuous, and in breadth nearly equal to half the vessel's beam. With the same object of facilitating the passage of cargo to and from the hatchways, hold pillars have almost disappeared, and in place of the double row of slender pillars at intervals of about 4 feet, we find large open holds and decks supported by continuous longitudinal girders under the beams and four large plate-and-angle pillars only.

The steam which still remains the best means of handling cargo, being more robust and less complicated than either electric or hydraulic plants. The winches themselves have been greatly improved, and instead of a single 6 in. by 10 in. winch at each hatch and chain falls, we find a pair of 8 in. by 12 in. machines with helical gearing and wire-rope pendants. The normal derrick is now of steel tube for a 6-ton lift in place of the old 3-ton wood derrick, while a special steel derrick at each end of the vessels can handle a load of 30 tons. At the same time the size of the drums has increased from 12 in. to 24 in., and the working pressure from 50 lb. to 100 lb. Larger wearing surfaces have been provided and locomotive type valves fitted, so that the cargo winch of to-day is not only more powerful and more rapid than

its predecessor, but also has greater immunity from breakdown.

Crews' accommodation has been greatly improved. Comfortable mess-rooms are now provided separately from sleeping quarters; galvanized iron berths have replaced wooden bunks; steam heating and stoves are provided; each man has a locker fitted with drawers for his clothes, and his chest goes to a separate store-room; there are plunge and shower baths for seamen and for firemen, as well as for the captain, officers and engineers, and a well-equipped hospital is provided.

The Propelling Engine.

The triple-expansion engine still holds its place in the engine-room of the cargo tramp. The fourth cylinder of a quadruple engine would mean additional complication and one or two additional engineers. Three main boilers of equal size are used, two under forced draught for propulsive purposes; the third under natural draught for dealing with cargo and to assist the others in cases of emergency when a little extra speed is called for. In comparison with the 1,000 tons of coal consumed daily by the swift liner, the 30 tons of the cargo tramp appears so small that it would seem hardly worth while to attempt to reduce it; but the $\frac{1}{2}$ lb. of oil per brake horsepower of the Diesel engine, together with the saving in weight and space and time for bunkering, is already attracting the attention of the owners of cargo vessels, and the economy of the geared turbine proposition is also being considered.

Miscellaneous Craft.

I regret that within the limits of the time at my disposal I cannot refer in detail to many other notable changes which have taken place during the past twenty years, such as the disappearance of the sailing ship, the wide application of engine power to fishing boats, barges and other small craft, and the remarkable performances of the hydroplane boat. These would of themselves take up an entire evening.

In numbers and dimensions there has been a rapid development of vessels built for the carriage of petroleum in bulk. In 1893 Lloyd's Register contained the names of forty-seven vessels engaged in carrying oil cargoes, and seventeen were in course of construction. The largest on service was the *Turbo*, 350 feet in length, and capable of carrying 5,000 tons of oil in bulk. To-day there are 370 vessels on the Register, the largest being the *San Fraterno*, 530 ft. in length and loading 15,700 tons of oil. Vessels specially fitted with refrigerating holds for the carriage of perishable cargoes, such as fruit and meat, have also been greatly developed and improv-

ed. The steam yacht has passed through structural changes not dissimilar to those which have affected mercantile vessels. Dimensions have generally increased and superstructures have been added. The weather deck is now further above water, and the principal accommodation and public rooms carried out to the ship's side in place of being confined to a long deck-house. Turbine propulsion has in many cases been adopted with success in place of reciprocating engines.

Boiler Design and Construction.

With regard to the changes in boiler design and construction, these have been small. The cylindrical boiler has remained almost unchanged in general design during the last twenty years. Boiler shell plating, owing to the high pressures now adopted, is much heavier, and where weight is a consideration is often of high tensile steel. Boilers of the water-tube type, which have entirely superseded the cylindrical type in warships, have made but little progress in the favor of the average shipowner, and have been adopted only to a very limited extent in merchant ships in this country. Recently, however, their great advantages in lightness have secured their adoption in several Channel steamers, and some small Australian vessels have been fitted with boilers of the Babcock and Wilcox type.

it is likely that superheating will be much more widely adopted in the near future.

Fuel Economy.

With regard to the gain in fuel economy, brought about by the developments which have taken place, it is difficult, owing to the varying factors involved, to state this in general terms. Taking, however, the classes of ship separately, the average values are given in the table in the next column.

The problem of mechanical stoking, which has been successfully solved for the less severe conditions of land practice still awaits solution as regards conditions afloat. Ideal conditions in this respect would be more easily reached by the extended use of liquid fuel, the advantages of which are obvious. Much progress has been made in perfecting apparatus for the proper combustion of oil, and its use would very rapidly be extended, but for the sufficient reason that the present relative prices of oil and coal are such as to make the use of oil for burning in furnaces, except in specially favorable instances, out of the question commercially. On the general economic question of the oil supply depends also the rate of future progress of the latest development in marine propulsion of the large internal combustion engine.

Comparison of Fuel Consumption and Weight of Machinery, 1893-1913. For Same Effective Horse-power.

	Relative fuel consumption.	Relative machinery weight.
(1) ATLANTIC PASSENGER SHIP.		
1893—Twin-screw triple-expansion engine; cylindrical boilers.....	100.0	100.0
1913—Four-screw triple-series turbines; cylindrical boilers.....	90.0	81.0
1913—Four-screw triple-series turbines; water-tube boilers.....	94.0	60.0
(2) INTERMEDIATE LINER.		
1893—Triple-expansion reciprocating engine; cylindrical boilers....	100.0	100.0
1913—Quadruple-expansion reciprocating engine; cylindrical boilers....	92.5	91.0
1913—Combination, reciprocating and turbine cylindrical boilers....	80.0	94.0
(3) CHANNEL STEAMER.		
1893—Twin-screw triple-expansion engine; cylindrical boilers.....	100.00	100.0
1913—Three-screw direct turbines; cylindrical boilers.....	87.0	71.2
1913—Twin-screw geared turbines; cylindrical boilers.....	74.0	82.0
1913—Twin-screw geared turbines; water-tube boilers.....	76.0	60.0
(4) CARGO TRAMP STEAMER.		
1893—Single-screw triple-expansion engine; cylindrical boilers....	100.0	100.0
1913—Ditto, with superheater.....	85.4	100.0
1913—Single-screw geared turbines; cylindrical boilers.....	76.0	84.4

A considerable departure has been made in the fitting of the large German Atlantic vessel *Imperator* with boilers of the Yarrow type; and in a large liner at present under construction on the Clyde, Babcock and Wilcox water-tube boilers are being adopted. The increasing cost of fuel, and the economy obtainable by the use of super-heated steam, has tended to hasten development in that direction, and a fair number of ships, including the liner under construction just referred to, are being fitted with superheaters. A saving of from 10 to 15 per cent. in fuel consumption has been shown to be possible, and

The Internal Combustion Engine.

The application of the internal combustion engine to marine propulsion is no new development, small engines having been constructed for this purpose more than twenty years ago. During the last decade, however, rapid progress has been made with small engines using the lighter petroleum spirits and oils, and the extent to which the steam engine has been superseded in small craft, such as launches and pinnaces, is apparent. For this class of work the advantages of the internal combustion engine in lightness, smallness and general

convenience are such as to make the steam engine almost obsolete.

The problem of producing a reliable engine of the internal combustion type of large power, without undue complication of design, and sufficiently low in first cost and maintenance to be able to compete successfully with the steam engine or geared turbine, is a much more difficult one. Much experimental work has been done with this end in view, and there are many attractive possibilities.

Comfort on Board Ship.

Comfort on shipboard has vastly improved during the past twenty years. Spring mattresses and brass bedsteads have replaced the old wooden bunks, improved systems of heating and ventilation have been introduced, sanitary arrangements are greatly superior both in quantity and quality, while the furnishings of the public apartments and the attractions of the dining saloon vie with those of the finest hotels on shore. Third-class passengers have now separate cabins for four, six or eight persons each, in place of large open 'tween-deck spaces filled with tiers of iron beds and accommodating hundreds.

Anti-rolling devices have been greatly developed. The use of free-water chambers, first suggested by Sir Philip Watts in 1875, and adopted in H.M.S. *Inflexible* and the *City of Paris*, have been reintroduced on an exact scientific basis by Herr Schlick in Germany, and Mr. Sperry in America, have successfully applied the gyroscope to the reduction of rolling motions.

Wireless telegraphy, introduced in 1896, is now fitted in over 1,800 ships and 270 shore stations. By its agency each steamer can keep in direct touch with her sisters or with the shore. Already this power of communication over long distance has proved of inestimable value to vessels in distress by enabling them to summon immediate assistance. Wireless telegraphy is probably the greatest boon ever given to those in peril at sea. As a preventive means, submarine sound-signalling has proved itself to be of immense value, especially where the mariner is surrounded by his most dangerous enemy—fog. It is well known that during fog, both light and ordinary sound signals become very unreliable, whereas the state of the atmosphere has no effect upon sounds transmitted through the sea. The first submarine bell was installed in 1901, and to-day there are about 140 fixed bell stations, and over 1,000 vessels fitted with listening apparatus.

Freeboard, Subdivision and Lifeboat Equipment.

The important questions of freeboard, subdivision and lifeboat accommodation have all received a considerable amount

of attention in recent years, and special committees have lately been appointed to investigate each of these intricate problems, so that nothing that human skill can devise may be left undone to secure the safety of human life and property entrusted to the vessels of our mercantile marine. The 1892 Bulkhead Committee set as its highest standard the ability to remain afloat with any two adjacent compartments simultaneously flooded. The *Campania* was one of the first vessels to comply with the conditions laid down, and the *Scot* was also a "two-compartment" ship. Since that date not many ships have fully met the requirements, which were found in many cases to interfere too much with passenger and cargo facilities.

The new *Empresses* on service in the Far East and the new *Allan* liners have been made into "four-compartment" vessels, and it is more than probable that the new Bulkhead Committee will set a higher standard of safety than their predecessors.

One of the most appalling dangers at sea is that of fire, and in recent years many new systems of meeting this emergency have been introduced. The now universal replacement of candles and oil illumination by electric light has eliminated one of the most frequent causes of conflagration, and should fire occur, systems of piping led into every part of the ship can quickly convey water, steam, carbonic acid gas, sulphurous vapour, or the exhaust gases from the funnels so as to deprive the flames of the oxygen which is their life.

Progress From Intellectual Genius.

The solid progress recorded, with but little assistance from that manual labor which to-day claims to be the sole producer of wealth, has been the inevitable result of the persistent intellectual effort, amounting at times to genius, of the many men whose names are as household words among us, and will live imperishably in the annals of our profession. It is impossible to review the history of marine construction without being forcibly impressed by the greatness of the debt we owe to such men as James Watt, Scott Russell, Brunel, John Elder, Sir William Pearce, Sir William White, Dr. Elgar, the Froudes, the late Dr. Denny, and many others who have passed away, as well as the Hon. Sir Charles A. Parsons and others who are still fellow-workers with us.

Active and daring minds have ever been questing forwards, and no opportunity for advance, no probability of new development, has been allowed to pass without thorough sifting and examination. The needs of the coming years have been anticipated, the engineer has ever been in the van and not in the rear of material progress. We

have seen how the ocean liner has steadily advanced in dimensions and speed. The only apparent obstacles to continued increase are those connected with finance and with the sizes of docks and harbors. In view of past experience, he would be bold indeed who would place any limit upon what the future will bring forth.



CANAL TRAFFIC 1913 SEASON.

THE report recently issued by the Department of Railways and Canals shows that for the season 1913, a total tonnage of 51,319,426 passed through the various Canadian canals. The tonnage for 1912 was 46,952,605 tons; there is therefore an increase in favor of 1913 to the amount of 4,366,821 tons, although an overall increase falls to be recorded, decreases amounting to 62,813 tons, 26,912 tons, 1,699 tons, 21,384 tons, and 14,254 tons are shown by the returns from the Chambly, the Ottawa, St. Peter's, The Trent, and St. Andrews canals respectively. The figures for the present season together with the increases or decreases compared with season 1912 are given below:

Canal.	Tonnage.	Increase.
Sault Ste. Marie...	42,022,609	2,920,815
Welland	3,545,984	726,973
St. Lawrence	4,275,863	823,400
Murray	180,576	11,605
Rideau	171,223	11,090

Canal	Tonnage.	Decrease.
Chambly	555,602	62,813
Ottawa	365,438	26,912
St. Peter's	65,108	1,699
Trent	55,728	21,384
St. Andrew's ...	81,295	14,254



PILOTS' CORPORATION TO GO.

THE Canada Shipping Act is to be consolidated, revised and amended at the next session of Parliament. One of the most important changes will consist in carrying out the recommendations of the Pilotage Commission designed to improve conditions on the St. Lawrence. With that end in view, the Quebec Pilots Corporation is to be abolished. Heretofore it has been an independent corporation exercising wide powers of its own, and under the Departmental Authority in a nominal sense only.

It is proposed now to have in all parts of the country a uniform system governing pilots and the conditions under which they operate, and this will be directly under the Department's administration and supervision. With newer and stricter regulations it is believed the number of accidents will be materially lessened.

The Upkeep and Management of Boilers on Tramp Steamers*

By G. A. O'Neill

The up-keep of a boiler, says the author, depends a great deal on the management of it, and it is generally understood that the successful management of a boiler consists in getting the desired results with as low a cost as possible. To be able to do this it should be handled with proper care, and any defects showing should be remedied at once, or at the first opportunity, and their causes removed.

THE greatest source of trouble with boilers is internally through corrosion and the depositing of scale on the heating surfaces. Internal corrosion may arise from various causes, viz., impurities brought in with the feed water, air in the feed water, mechanical straining, and in many cases through galvanic action being set up between two classes of metal in the construction of the boiler. If sufficient interest and care is taken internal corrosion may be prevented to a greater extent than is often the case on tramp steamers by the present means available for stopping or reducing it, such as the use of zinc plates, keeping the feed water as hot as possible for liberating the air, and adopting the use of alkalis (soda) in the proper manner.

Sufficient care is not always taken when fitting zinc plates into the boiler, by not cleaning away the dirt and scale from around the necks of the studs, to which they are at some parts fitted, so as to ensure a proper metallic contact. If this is not done the dirt and scale acts as an insulator, and so destroys the object for which they are used, viz., in setting up galvanic action between the zinc and the boiler plates. It is a simple matter when fitting these plates to give the studs a touch up with a file.

The use of soda is an aid for the prevention of corrosion, or rather, in reducing the acidity of the water. This is very often used without any consideration as to the amount required. If an engineer knows that his boilers are properly cleaned and the necessary zinc plates fitted when leaving port, by the use of litmus papers, he can get an idea as to whether he is putting sufficient soda or otherwise into the boilers on the passage. A small quantity of water can be drawn off at the salinometer cock, and the litmus papers inserted; if the blue paper turns pink and the pink paper remains unchanged, the water contains acid; if the result is the opposite the water is alkaline in nature.

Treatment of Corroded Plates.

By careful treatment of corroded plates in a boiler, they can often be prevented from further deterioration; for instance, the pitting that is frequently found going on, along and a little above the line of fire bars, on the water side of a furnace. These places, if thorough-

ly cleaned and the black scale removed, then coated with a mixture of metallic zinc powder and clean fresh water, will give good results, but it must be kept up and the same places done over again after every long passage.

Corrosion often sets up on the front end plates and the front end of the main stays in the steam space on the side of the boiler to which the uptake is fitted. Some engineers to arrest this suspend zinc plates from the stays by means of iron hangers. The presence of zinc no doubt is an advantage, but this method is not an advisable one, owing to the inability of the zinc plates breaking, falling off the hangers, and landing on the top of the furnaces. A good method is to fix iron boxes on the stays and let the zinc plates rest in them.

Good results have been obtained by filing the ends of the stays clean, and

going on badly under this scale on the furnace bottoms, which, had the furnaces been kept cleaned right round might not have ever started. In any case it would have been seen at the commencement when steps could have been taken to remedy it.

The backs of combustion chambers and the necks of the stays at the combustion chamber end are another source of trouble due to corrosion, and require every attention and care. When corrosion has once started here, it is hard to stop owing to its inaccessibility. Probably the best means of stopping it is to clean the parts as well as possible and fasten zinc plates to the stays midway between the boiler end plate and the combustion chamber back.

Internal Feed Pipes.

Internal feed pipes, when fitted, should be given every attention, as the



18-K. Culebra Cut. Loading holes with dynamite at foot of Contractor's Hill. Looking north. Sept. 20, 1913.

cleaning the front end plates as before stated on the furnaces, and painting them with zinc white, but this also must be kept up. It is quite a general practice when scaling furnaces to only scale them down to the line of fire bars, leaving the entire bottoms untouched, scale being allowed to form to a considerable thickness and being left on for voyage after voyage. This I consider to be very bad practice, as corrosion has been found

position in which the feed water is discharged into the boiler has a material effect on the circulation, which goes to show that should they be allowed to remain in a bad state of repair, the result would be loss of efficiency. They often give trouble by continually bursting, and in many cases, if not well secured by clamps, come off altogether. This may be said to be due to water hammering caused by the internal pipe becoming

*From a paper read recently before the Institute of Marine Engineers.

partly filled with steam, and the feed pumps, every stroke, delivering comparatively cool water, produce a concussion by the sudden condensation of the steam, which forms a vacuum in the pipe and causes an inrush of boiling water.

In Mr. Stromeier's book on boilers, it is stated that a small hole near the flange on the pipe or an uncemented joint entirely prevents this action. This has certainly been found to work well with the uncemented joint, but with copper internal pipes another trouble arises. Corrosion sets up badly on the boiler plate to which the brass flange of the pipe is jointed, also the stud, when of iron or steel, gets corroded. This is undoubtedly due to galvanic action between the copper pipe or brass flange, and the boiler plate and studs. It is, therefore, necessary that this joint should be kept tight when copper pipes are fitted.

Another advantage gained by internal feed pipes is that the feed water passing through them becomes heated before being discharged, and further loses any air it may contain. In modern ships the foregoing troubles are somewhat eliminated by the fitting of independent feed

boilers is seldom over 150 degs. F., and although evaporators and filters are fitted, it is, in many cases, found necessary to work the boilers at about 5 ozs. density to keep a protective scale on the plates, especially with new boilers.

Raising Steam.

When commencing to raise steam, it is quite a common rule with many engineers to set the fire away in the centre low furnace of a three-furnace boiler four or five hours before the others in the hope that the cold water which remains undisturbed at the bottom will get warm. This rule undoubtedly originated in old ships, where there were no appliances fitted for artificial circulation, such as hydro-kineters, or a suction pipe from the boiler bottoms to a feed donkey pump. With these appliances I consider the above practice unnecessary, as it must set up an undue strain on the front end plate by the centre furnace becoming heated and expanding, and the two wing furnaces remaining cold and rigid, to which may be attributed the cause of leaky furnace mouth seams when happening under such circumstances.

convenient. If this is not done the air forms a pressure, and this air pressure on the surface of the water prevents the formation of steam bubbles when boiling point is reached, which would materially assist the circulation by carrying water with them as they rise.

The safety valves should be left open until steam is blowing through them, and the hydrokineters or donkey pump, as the case may be, kept working until the boiler bottoms have grown quite hot. It is often the case that, after steam has been raised, it has not been wanted for some time, through delay, and with the boilers standing and no circulation going on the bottoms will become quite cold, even when the steam is at working pressure. If a donkey pump is the only means for circulating, difficulty will be found in getting it to work, if at all, with high pressure on the boilers.

To guard against this drawback, it is always advisable to fill the boilers up full glass, and blow off the cold water from the bottoms at intervals. Should there be no delay, it is still an easy matter to blow the water off before starting. This method of blowing might be adopted when lying under banked fires, especially when fresh water is obtainable for making up the loss. If the boilers are allowed to stand long with their bottoms cold, under pressure they are sometimes unable to bear the additional straining to which they are subjected by the difference of temperature between practically the upper two-thirds and the lower one-third of their circumference, and if not causing a cracked shell plate it is invariably the cause of leaky circumferential seams, which, when once started, are a trouble to keep tight ever after.

This difference of temperature can amount to considerably over 250 deg. F., and as iron expands .0012 and steel .0011 of their length between 32 deg. F. and 212 deg. F., it can thus be seen that with a large boiler a severe stress would be set up. Siemen's steel has now taken the place of iron in boiler making, and as it possesses a much higher tensile strength, together with greater elasticity, the danger of cracked shell plates is considerably reduced, but as the percentage of strength of the circumferential seams is comparatively low, the danger of sheared rivets and leaky seams has still to be guarded against.

External Combustion.

In dealing with the external parts of a boiler, there are many things in the management to which sufficient care is not always taken which lead to preservation and upkeep, the bottoms of combustion chambers on the fire side, for instance. Here an incrustation of scale and dirt, if not watched, will form, and



5181 X 3. Gatun Upper Locks. Looking south from lighthouse on west wall showing south entrance to locks. Oct. 11, 1913.

pumps and efficient feed heaters where the feed water is delivered into the boilers at over 200 deg. F., practically free from air. Impurities are further extracted by the use of modern feed water filters, and with a good evaporator the use of salt water feed is reduced to a minimum. In the class of ship to which I am referring, where the feed water is dealt with solely by the main feed pumps, the highest temperature at which the feed water can be pumped into the

For this reason all fires should be lighted together, especially when there are means of promoting artificial circulation. Too much care cannot be taken in attending to the circulation when raising steam. When the fires are set away, the safety valves should be opened to allow the heated air in the steam space to escape. Another plan is to ease the stop valves off the face and allow the heated air to pass through and warm up the engines, but this is not always

with the combustion chambers being frequently swept and scraped out, the scale obtains quite a smooth surface and appears like the plate itself. It can easily be detected by a tap with the round end of a hand hammer, when it will break off in flakes. If this is allowed to form, corrosion invariably goes on underneath it, and the thickness of the plate is sometimes seriously reduced before being noticed.

Salt from leaky tubes and joints, when mixed with wet ashes, causes corrosion, and as this often occurs in the combustion chambers, it is essential that any leaks noticeable should be stopped at the first opportunity. The boiler front end plates at the bottom suffer a great deal by wet ashes coming in contact with them. This cause can be eliminated to some extent when at sea if the ashes are removed from the furnace fronts immediately after the fires are

Furnace Doors.

These being in constant use soon get out of order, and as they are an important item regarding economy, it is necessary that they should be kept in proper repair. If not kept properly fitted with baffle plates they soon become warped with the intense heat to which they are subjected. The difficulty then arises in getting them to shut closely, and cold air is allowed into the furnace in excess, and so reduces the efficiency of the boiler.



TWO NEW BOATS BUILDING.

CONTRACTS for two boats for Hudson Bay traffic are being let in Great Britain. These boats are being built by the North Railway Company, and will ply between Fort Nelson and

Port Nelson. These boats are being built by the North Railway Company, and will ply between Fort Nelson and

Port Nelson. Although there is no doubt now of the navigability of Hudson Straits at present, yet this other water route will be open longer, and will provide a second outlet for western traffic sent by Port Nelson. From Nottawa, the North Railway will be built for 200 miles to connect with the Transcontinental running to Quebec. This alternate route will place western grain in Quebec city, and hopes are now expressed that this port can be kept open nearly all the year.

While private enterprise is developing this alternate route, the Government is going ahead rapidly with the work on the railway and harbor at Port Nelson. To have everything in readiness for the 1915 crop, the Government, it is understood, is already arranging for lines of steamships to take the western crop from Nelson via the Straits. Railway, harbor and steamships will all be ready for the 1915 crop.



GOOD HARBOR PROSPECTS AT NOTTAWAY RIVER.

THE results of hydrographic surveys conducted throughout the summer under the auspices of the Naval Service Department, lead to the conclusion that first-class harbor facilities are to be found in James Bay in the vicinity of the mouth of the Nottaway River. Doubt has for some time been expressed as to the harbor possibilities of James Bay, but these, it is stated, have been laid at rest by the summer investigation of the survey party. Good shelter, ample room and a sufficient depth of water have been found, and very little silt is in evidence to necessitate dredging. Soundings indicate plenty of water right out into the bay. Examination of conditions at the mouth of the Moore and Rupert Rivers shows that they are out of the question as harbor possibilities. Ice conditions will, of course, have to be contended with in James Bay, but the difficulties in this connection are by no means insurmountable for navigation.

Hon. Frank Cochrane, Minister of Railways, has already expressed his confidence in the James Bay route, with railway connection from Montreal and Quebec, as an alternative route from Port Nelson via Hudson Straits.



26-0-9. Balboa Terminals. General view of the machine, erecting and tool shops, forge shop, steel storage and boiler shop. Oct. 7, 1913.

cleaned, and not allowed to remain there until the end of the watch, as is often the case.

Great care should always be taken when putting on bottom manhole doors to ensure a good joint. These doors, when leaking constantly, cause the flanges of the plate to get corroded away, which in time renders it impossible to make a proper joint. This trouble is further influenced by the presence of wet ashes when the manholes are in the stokehold. More often than not, ashes accumulate on the manhole flanging between the "dogs" of the door, and any salt leaking from the joint forms a solid mass with the ashes on the door, and might remain this way when on a long passage; corrosion going on all the time.

Port Nottawa, Quebec. They will be known as the Nottawa and Nelson, and each will have a carrying capacity of 200,000 bushels of wheat. They will be ready for service in 1915, when the Hudson Bay Railway will be completed.

When the Canadian Government decided to build the Hudson Bay Railway, and when Hon. Frank Cochrane agreed to grant a liberal subsidy to the North Railway enterprise, the Minister of Railways especially referred to what he designated as the "saving clause," which meant that if the navigation of the straits could be carried out there would be no trouble about the Nelson and Nottawa route.

Chief Factor Nicholson, of all the Hudson Bay Companies' posts on the east side of the Hudson Bay, stated, af-

CONCERNING FLOATING DRY DOCKS.

THE decision of the Hamburg-American Line to send their latest liner, the *Imperator*, to be dry-docked at Liverpool for boiler alteration, has resulted in many erroneous statements concerning the inability of the Germans to dock their huge liners and warships. While it is true that there are no dry docks at present in Germany capable of accommodating such huge craft as the *Imperator*, the Germans, nevertheless, possess floating docks that can take their largest craft. At Hamburg there is a floating dock with an extreme lifting capacity of 50,000 tons. Before the *Imperator* started across the Atlantic on her maiden trip she was docked on this craft, being the largest and heaviest vessel that has ever been picked up out of the water in this manner.

Why is the *Imperator* coming to England to be docked? The reasons are many. In the first place, it is proposed to lay the vessel up for some time, and the huge "floater" at Hamburg cannot very well be spared for so long a time. Then, on account of her deep draught, it is not easy to get the liner into Hamburg. Last time she visited this port she grounded twice, and only reached her destination with the help of powerful tugs. Again, the Hamburg-American Line is a private concern, having no subsidy whatever from the Government, and can dock its ships where it likes. Furthermore, it is anxious to secure the British passenger traffic across the Atlantic, and sending their vessel to be docked in England must result in public attention being drawn to the wonders of this floating palace.

Popularity of the Floating Dock.

The statement, therefore, that the Germans have suddenly found themselves unable to dock their latest liner, not to mention her sister ship, the *Vaterland*, which will be ready for service next spring, is wrong. Incidentally, too, it brings to public notice the wonders of the floating dock, which possesses many advantages over the stationary or graving dock.

Indeed, this type of dock is becoming more popular every year among ship-owners, while another point that makes a reference to this craft interesting is the fact that in naval engagements of the future they are likely to play a no mean part. The Germans have already recognized this, and at all their important naval stations there are floating docks capable of lifting their heaviest battleships.

In this respect the British navy has not been behind, for in the Medway now there is stationed a floating dock which has a lifting capacity of 33,000 tons.

This is of sufficient power to raise super-Dreadnoughts and battle cruisers of the latest class. It has a total length of 680 feet, a breadth of 144 feet, and an inside width between walls of 113 feet. The heaviest ironclads can be raised clean out of the water by this mammoth cradle of steel in two and a half to three hours. All kinds of repairs can then be effected as expeditiously as in a stone dock.

Lower Initial Cost.

Foremost among the considerations which have led to the popularity of floating docks is that of reduced initial cost as compared with that of the excavated dock. Whereas a floating dock, capable of lifting the largest battleships, would run away with, say, \$1,000,000 to \$1,250,000, a graving dock would demand an outlay of perhaps two and a half million dollars. Indeed, the con-

crete with granite facings, was so much disturbed and cracked after only two years' service that the owners had to decide between spending \$340,000 on its repair, or rebuilding the dock throughout.

True, this is an exceptional instance, but the construction of graving docks is, nevertheless, a difficult and uncertain matter in some localities, especially in those where the ground is of a sandy or porous nature. Under such conditions the walls and floor must be borne up on long piles reaching down to a more solid substratum. In fact, in certain localities, it is impossible to build a graving dock except at a prohibitive cost.

Rapidity of Construction.

Another important reason why floating docks are likely to become still more numerous in the future is because of the rapidity and certainty with which they



3½ H. Culebra Cut Culebra, completion of bottom pioneer cut, steam shovels No. 230 and No. 222 meeting at grade, looking south from West bank, May 20, 1913.

struction of a dry dock 1,000 feet long by 100 feet broad, 50 to 60 feet deep, is a formidable undertaking, and one which would occupy several years. The dimensions by no means fully represent the amount of mere excavation. The dry-dock engineer has to build very thick walls and floors, or the former will be bulged in by the earth pressure, and both walls and floors penetrated by the water that is always present in ground near the sea.

The masonry is, therefore, very massive, and the bottom is made in the form of an inverted arch to resist upward pressure, and to enable the walls to stand the thrusts inwards. So severe are these thrusts that a big dock in Scotland, to take an example, built of con-

crete can be constructed. Over and over again the shipping world has been astonished with the ease and quickness with which these structures can be turned out.

A few years ago a yard on the Tyne built and delivered in the Baltic a dock of 11,000 tons' lifting capacity for the Stettin shipyards in seven and a half months from the signing of the contract. A dock of 12,000 tons was built for the Spanish Government for service in Cuba, and towed from the Tyne to Havana, a distance of 6,500 miles, within eleven months from the time the bottom plates were laid in the yard. Recently, a floating dock for the Suez Canal was built and launched and ready to undergo its lifting trials within thirteen weeks.

On the other hand, three or four years

are not infrequently occupied in the construction of an excavated graving dock, and there are instances where such structures have taken five, six, and even seven years to complete. Fifteen years were spent on the construction of one in the United States.

In appearance, the modern floating dock may be said to resemble a huge box without ends or top. The bottom consists of a tank or pontoon, or several pontoons securely fastened together; and it is by filling these pontoons with water that the dock is sunk sufficiently to enable a ship which requires docking to be floated over the pontoons.

The vessel is then hauled in between the walls of the dock by capstans fitted on the tops of the walls. By powerful pumping machinery located in the dock walls the water is removed from the pontoons, and as they are emptied the dock gradually rises until the ship is lifted clear of the water. While in the dock, the ship rests on keel-blocks, and is further supported by mechanical side-shores.

Electrically Lighted.

The floating docks are lighted throughout with electricity so that ships may be docked at night as well as during the day. On the top of their walls is a miniature railway on which run travelling cranes capable of lifting a weight of several tons. In the walls, too, are the living and sleeping quarters of the crew dwelling on the structure. On account of their open ends, they can support vessels longer than themselves. Thus, if a dock does not possess sufficient power totally to raise a disabled ship, it can at least lift enough of the vessel out of the water to effect the necessary repairs.

On account of their wonderful mobility, and the fact that these craft can be used in harbors, at rivers' mouths, in open roadsteads, and in any sheltered position, naval architects and experts lay great stress upon the value of floating docks as an adjunct to a navy in time of war. They see no reason why a floating dock towed by a powerful tug, and fully equipped with stores and tools suitable for rapid repairs, should not follow the movements of a fleet.

As they point out, the first sea-fight between fairly matched fleets would leave a number of wrecks on both sides, and the commander who had the nearest base, and so could "come back" first, would hold an enormous advantage.

Port Competition.

Owing to its mobility, the floating structure possesses this advantage over a stationary one: should trade desert one port for another, the floating edifice can follow, while the graving dock remains—idle. Also, the former is much cheaper to work. Speaking generally, the cost of

pumping in a floating "cradle" is, on an average, only about a quarter of that of a graving dock.

From the workman's point of view, also, the "floaters" has its recommendation. Instead of having to work at the bottom of a hole where the light is bad and the air damp, he finds himself on a well-lighted platform swept by breezes—which quickly dry the paint—and free from the discomforts often caused by leakage in a graving dock.

The floating dock is constructed on the most convenient site possible, namely, the yard of a shipbuilder. On launching, it has the whole world open to it. From Great Britain, floating docks have been towed to Durban, in Natal; to Brazil, to Callao, on the west coast of South America, and to numerous other distant places. They have also been exported in sections for re-erection on the waterways

craft that has ever passed through the Suez Canal. Altogether it cost the United States Government \$250,000 to tow her to her destination.

Equally trying was the conveying of the floating dock from the Tyne to Callao. The dock left in August, in charge of two powerful tugs, but did not arrive at Callao until the following April. In the Atlantic heavy seas were encountered, and progress was slow. Off South America, hawsers snapped, and in one violent storm both dock and tugs were seriously damaged, necessitating a delay of some two months for repairs.

The dock was towed right through the Straits of Magellan, and not a few experienced seamen prophesied that the attempt would end in disaster, but the tugs and dock won through, though somewhat damaged, and in due course anchored outside Callao.—S.C.



33 x 8. Operation of Pedro Miguel Locks. Dredging fleet leaving Pedro Miguel Lock, east chamber, to enter Culebra Cut. Oct. 24, 1913.

of Russia, and likewise carried in this manner to Japan.

A Daring Towing Feat.

What is regarded as the most daring towing feat on record was the conveying of the floating dock Dewey from Baltimore, in the United States, to the Philippine Islands. This unwieldy craft made the journey via the Suez Canal, thus covering a distance of 14,000 miles.

She was in charge of three tugs, and met exceedingly rough weather. In the Mediterranean, in a storm, the fifteen-inch manilla hawser snapped, and for two days the huge, unwieldy craft drifted about, washed by great seas. Her crew of fifteen had an anxious time, as if the structure had been driven upon the rocks she would have been wrecked. When one of the tugs managed to get a rope over her, the dock had drifted over 150 miles. The Dewey is the largest

THE CANADA STEAMSHIP LINES, LTD.

THE amalgamation has now been completed of all the principal Navigation Companies running on the Great Lakes, under the title of the Canada Steamship Lines, Ltd., the Richelieu and Ontario being the last concern to join the combine. The total authorized capital is nine million dollars. Among the firms interested are Vickers, Ltd.; Furness Withy & Co., and Brown, Shipley & Co.

The combination constitutes something like a monopoly of Canadian inland waterway shipping, and, by including the Quebec Steamship Co., it will have a through line to New York and the British West Indies, although its operations will be chiefly concerned with the transport of goods between the Dominion and Great Britain, with special

reference to the shipment of agricultural produce from the great North-West.

When the Welland Canal, connecting Lake Erie and Lake Ontario, is completed, and the work is now in hand, the Company's vessels will be able to run from Fort William, at the head of Lake Superior, to the ocean, so that the necessity for transshipment at Montreal will be avoided. This, it is expected, will materially relieve the serious congestion at that port during the grain season, and divert a large amount of trade from United States channels.



PORT OF MONTREAL DEVELOPMENT.

ALL the water-borne commerce from the ocean and the lakes is drawn automatically to the point where ocean and inland navigation meet, and that

the splendor of Montreal's development may proceed under these conditions with the assurance that from prestige of position, Canadians have had, and have, the opportunity of creating, with the smallest capital investment, the most efficient sea-terminals in North America.

"You see that nature has supplied the position in Montreal, and we have to create the efficiency and economic conditions to take care of the huge business that is silently developing in our country, and also attracting a share of the business originating in your Western States.

Only One Montreal.

"Every great country possesses one or more ports, which, by their particular situation, transcend in strategic trade-value, sister ports in the same country. There is only one Liverpool, one Hamburg, one Antwerp, one New York, and there can only be one Montreal, although many other valuable sea-ports grow up.

Comparative Expenditure.

"Glasgow, 18 miles from the sea, has spent \$65,000,000; her rival in the ship-building trade, Newcastle-on-Tyne, \$90,000,000; Manchester, 60 miles from the sea, \$80,000,000, and these three British ports, created at such cost, are each doing a monthly business less in value than that of the port of Montreal, created at a cost of \$23,000,000, expended since 1830.

Our Government, so far, has stood behind its Harbor Commissioners, and works on the broadest lines to encourage the development of the country through its policy as regards money expenditures on harbors and canals, and instead of throttling its railway systems, as your country seems to be doing, it is on the other hand, by all means in its power, encouraging their construction, treating and guiding them in a businesslike, fair manner, with the result that Canadians have a track mileage per capita very much in excess of that of the United States.

"Construction at the rate of \$3,000,000 per annum is going on in the port of Montreal, which money is secured by the issuing of debentures which the Canadian Government purchase at par, and all construction is of permanent character, concrete and steel.

Always Met Interest.

"To meet the interest, which we have always been able to do, we derive our revenue from shed-rentals, wharfages, grain-elevators, and the harbor railway. Our grain business has grown in 10 years from nothing to 62,000,000 bushels; our railway business practically 100 per cent.; our revenue from \$500,000 to \$1,500,000 and the net registered ship tonnage arriving and departing from the port from 8,000,000 to 17,000,000 tons.

"In order to take care of this huge increase in business, every facility begun during the past 10 years having been overtaxed before completion, the Commissioners are now carrying out, year by year, units of a general scheme of harbor development, which, when completed, will form a harmonious whole, which will double the capacity of the port, reduce the current by half its velocity, cut the cartage charges in two, create manufacturing and warehousing sites possessing direct rail-connections over all lines, deep water wharfage available to all ocean lines trading to the port, create low-priced power for the movement of harbor equipment, operation of grain elevators, etc., and will, when completed, give to the port of Montreal advantages not to be found in any port in North America."

Every paper read at the Convention made laudatory reference to the facilities and administration of the port of



Fig. 3. Operations of Pedro Miguel Locks. Opening upper guard gates. Looking south. Oct. 24, 1913.

point is the port of Montreal, 1,000 miles inland," were the striking words with which Mr. W. G. Ross, president of the Montreal Harbor Commission, prefaced his speech before the members of the National Convention of the Port Authorities of the United States, at the dinner which took place at Antoine's Restaurant, in New Orleans, recently.

"Approached from the sea," he continued, "by a channel to be shortly 35 feet in depth and 750 feet in width; met by the deepest and longest inland system of waterways in the world; accessible to every railway in the country on equal terms; owned by the people of Canada throughout the 16 miles of frontage on either side of the St. Lawrence; without a single vested interest to bar the way,

The area of our port is identical with Liverpool, and controlling 32 miles of river front, without a single interest to impede the progress of her development, her grain elevators and conveyor system, the largest and most efficient in the world, 10 miles of rubber belting being necessary, her railway with a trackage of 59 miles, place her in a position to handle the great and growing traffic in an economical manner.

"A glance at the difficulties overcome by other ports will emphasize these advantages, most of which are also possessed by San Francisco and New Orleans, where the water front belongs to the people, and where it has not been necessary to buy these privileges at a cost of millions.

Montreal. The one which Commissioner Tomkins of New York read, contrasted the conditions with those which hamper the port of New York, where the dock leases, some of which run for as long as 30 years, hamper the development of the port and tend to drive trade away.

New Orleans, it was shown, has splendid facilities for the handling of cargo, but the system which permits the port to be controlled by one authority, and the belt railway by another, is one which, it was complained, is liable to cause continual friction. The river, at the Gulf, is only 35 feet deep, so that ships drawing more than 32 feet cannot come up to New Orleans.



PROGRESS ON THE QUEBEC BRIDGE, 1913.

THE close of the year 1913 sees the work of constructing the huge 1,800 ft. cantilever bridge across the St. Lawrence River above Quebec well under way. In point of length it will rank as the longest span in existence, and in point of weight will also take a place as one of the world's largest bridges. The new Hell Gate bridge over the East River at New York, for the New York Connecting Railroad, is the only structure in progress or contemplation which exceeds the Quebec Bridge for weight of steel involved.

The construction of both main and anchor piers of the Quebec Bridge has now been completed on both sides of the river. These occupy the same centre line as the original bridge which collapsed in 1907, but are all farther to the south. The old piers have been removed down to two feet below low water mark, so as to cause no disfigurement to the view. Both main piers were constructed with caissons under pneumatic pressure and extend down to bed rock. The anchor piers on shore are above high water mark, and also extend down to bed rock. The whole of the sub-structure work has been carried out by the well-known firm of M. P. & J. T. Davis.

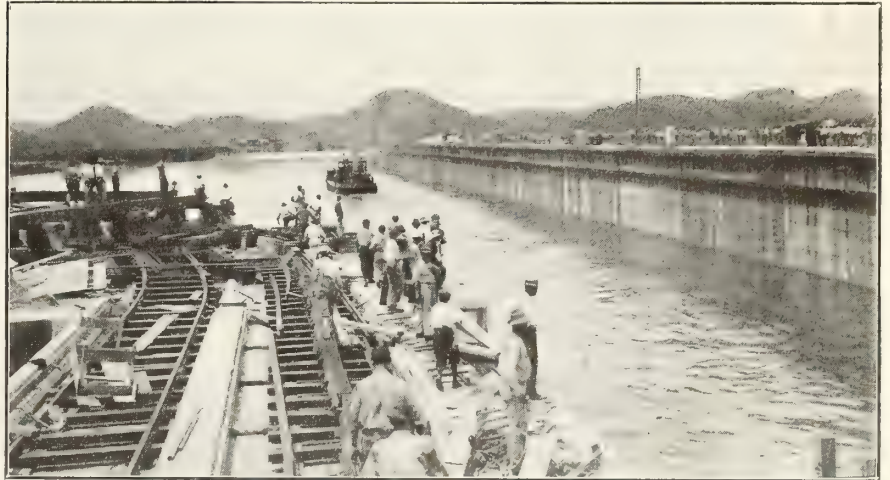
The contractors for the superstructure are the St. Lawrence Bridge Co., Ltd., Montreal, who have erected a large plant at Rockfield, Que., a few miles west of Montreal. This plant was described in the issue of "Canadian Machinery" for May 22 last. It has been designed primarily for the economical handling of this particular contract. The company have built at the bridge site, on the north shore, a completely equipped camp to accommodate about four hundred men, which is about the largest staff that will be employed on the actual erection work. The camp has the usual

dining hall, kitchen, bunk houses, hospital and other buildings; but is unusually well built and furnished, having even a special water service and sewerage system. This is made the more necessary by the fact that it will be in practically constant use for a period of five years, instead of for one season only.

Close to the north abutment of the bridge a power plant has been installed furnishing air and electric current for the work. Power is purchased from the Quebec Railway Light, Heat and Power Company at 22,000 volts, three-phase,

carrying the floor system and erection traveller, and the other the main trusses of the anchor arm. Most of the material for this falsework is already stored at the bridge site, ready for the opening of the season of 1914.

Over 6,000 tons of finished material for the bridge is now in storage on both sides of the river. This consists principally of track girders, track stringers, floor beams, sub-floor beams and floor bracing. The first of the enormous main shoes is now practically finished at the shops, and the second is well advanced. The construction of the bottom chord



30 x 12. Operation of Miraflores locks. First boat through entering Miraflores Lake, looking north. Pedro Miguel locks in the distance. Oct. 14, 1913.

60 cycles. The plant contains at present two Ingersoll-Rand 16 in. x 10 in. x 14 in. compressors, belt driven by 100 h.p. induction motors. Space has been provided for two additional machines. Since all the motors used on the work will use direct current at 230 volts, two 250 k.w. 250-volt D. C. generators direct driven by two k.v.a. 2,200-volt synchronous motors are already in place. Later on a similar plant, except that the primary voltage is 11,000, will be put in on the south side of the river. This is not required at present, as construction is being commenced on the north shore first.

On this shore all the approach spans have been erected by means of a derrick car. They consist of two single track bridges side by side, each containing one span of 110 ft. 7½ in., and one of 157 ft. 10½ in. Work is now in progress on the erection traveller for handling the main spans. This machine is in itself a large contract, as it weighs about 920 tons in working order, and stands 205 feet high above the rails on which it runs. An illustration is shown of this traveller in course of erection on the north shore.

In the erection of the anchor arms steel falsework will be used exclusively. Two separate systems are required, one

members and bottom lateral bracing is also under way. More than 1,500 tons of erection material have been fabricated and shipped from Rockfield, wholly for use on the north for the present. It is expected that a part at least of the steel falsework can be used again on the south shore, although the erection traveller will be duplicated on that side.

The concrete footings for the falsework posts have been finished on the north shore; so that as soon as the ice goes out in the spring of 1914 the traveller can commence the erection of the steel for staging. It is hoped to erect the north anchor arm complete during 1914, with the possible exception of the main post.



NEW C.P.R. ELEVATOR AT WEST ST. JOHN, N.B.

A NEW grain elevator which embodies the latest ideas in elevator design has recently been completed at West St. John, N.B., for the Canadian Pacific Railway, and received its first consignment of grain at the beginning of December. It has a capacity of 1,000,000 bushels, and was designed and constructed by the John S. Metcalf Co.,

Ltd., Montreal, the work having been carried out under the direction of J. M. R. Fairbairn, assistant chief engineer, C.P.R.

The elevator and the tracks serving it stand upon new ground, which was formerly beach. As the tide at St. John has a maximum rise and fall of 28 feet, the work of putting in the foundations was a matter of some difficulty, as the foundations extend for the most part below low water mark and the work was done before the earth fill was made. The building is 195 feet long, 93 feet wide and 202 feet high above track level, the foundations going 30 feet lower. The bins are of reinforced concrete on concrete columns, the latter resting on concrete piers going down to the rock. They are circular in form and 84 feet deep, the walls being 7 inches thick. The total number of bins is 171. Ten of the bins are used as shipping bins, with a capacity of 12,000 bushels each. The five-storey cupola is of structural steel covered in with corrugated galvanized sheeting, the floors and roof being of concrete. There are eight elevator legs, each with a capacity of 12,000 bushels per hour. From the garner the grain passes to eight Fairbanks 2,000 bushel hopper scales, which deliver to sixteen Mayo distributing spouts with a radius of 25 feet. The scales also distribute to two 36-inch transfer belts, which run the full length of the house, and can deliver to any of the Mayo spouts.

There are four receiving tracks running through the house, cars being handled on any of these by an electric car puller. The receiving capacity is 160 cars per ten hours, the grain being discharged into the 16 receiving hoppers by mechanical unloaders. The shipping capacity is 30,000 bushels per hour to steamships, the grain being carried to the wharves by two 36-inch belts in a conveyor gallery, which also connects with the C.P.R. No. 1 elevator. Provision has been made for doubling the shipping capacity when required.

All machinery is driven by induction motors, each unit having an individual drive. Current is supplied from a power house adjacent to the elevator. This contains two turbo-generator sets of 500 k.w. capacity each. Three-phase current at 550 volts, 60 cycles, is delivered by the generators, which were made by the Canadian General Electric Company. The turbines are by the Allis-Chalmers Co., Milwaukee. The condensing apparatus is of Worthington make, and was supplied by the John McDougall Caledonian Iron Works, Montreal. The condenser is of the counter-current barometric type, with a motor driven centrifugal circulating pump and a steam driven vacuum pump.

Steam is raised in four return tubular

boilers built by the Jenckes Machine Co., Ltd., the working pressure being 150 lbs. per square inch.

All the elevating and conveying machinery was supplied by the Dodge Mfg. Co., Toronto, and the Canadian General Electric Company supplied all the motors, the wiring for these and the lighting having been done by W. J. O'Leary & Co., Montreal. The Dominion Bridge Co., Montreal, supplied the structural steel work, while the corrugated covering was done by the Montreal branch of the Metal Shingle and Siding Co., Ltd.



"TURRET CHIEF" STRANDING.

THE decision of the Marine Court, held at Kingston, into the stranding of the Turret Chief of the Canadian Lake and Ocean Navigation Co., near Copper Harbor, in Lake Superior, severely censures the captain, suggests the use of a deep sea lead and line or a

into the trough of the sea and was driven ashore. The decision adds that the stranding was caused by the vessel not being able to head up to the sea, owing to her light draught and the propeller having no hold of the water, and also to her peculiar construction exposing a very high side to the wind, which, being strong on the beam, would tend to drive her to leeward very fast.

The court is also of opinion that she master, Thomas Paddington, did not do all that might have been done to try to save the ship, inasmuch as he did not appear to have made proper allowance for the large amount of leeway the ship was making, and, therefore, lost track of the vessel's position, and apparently he did not try to find out what speed she was making through the water after the patent log was lost during the night. The court is satisfied that had he put his ship on the other tack and headed her to eastward he might have had some chance of keeping her afloat, knowing,



41-0. Culebra Cut-Culebra, looking north from east bank—surface of water 72.3 feet above sea level. Oct. 30, 1913.

patent sounding machine on such vessels, and states that "an officially fixed light load line for all vessels would be a great protection to lives and property engaged in navigation on the Great Lakes." The court was composed of Captain H. St. G. Lindsay, Dominion Wreck Commissioner, assisted by Capt. Francis Nash and Captain W. G. Balten, acting as nautical assessors.

The report tells of the vessel leaving the Sault for Fort William in water ballast and with a crew of seventeen. She was drawing eleven feet aft and six feet forward, the propeller being half out of the water. When the wind shifted from north-west to north the vessel fell off

as he should have known, that the land, Keweenaw Point, was to leeward and only about thirty miles off when the wind came out from the north-west.

The court, therefore, severely censures him for this error of judgment and total ignorance or disregard of the most essential part of the duties of the master—namely, knowledge of the position of his vessel at all times.

The court criticizes the fact of this valuable vessel leaving port so light that her propeller was only half immersed and short-handed in the stoke-hold, especially at this season of the year. It was no doubt due to this that the vessel was not able to head up to the sea.

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H. V. TYRRELL, Toronto - Business Manager

PETER BAIN, M.E., Toronto - Editor

OFFICES:

CANADA—

Montreal—Rooms 701-702 Eastern Townships Bank Building,
Telephone Main 1255.

Toronto—143-149 University Ave. Telephone Main 7324.

Winnipeg—34 Royal Bank Building. Phone Garry 2313.

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THE SEASON'S GREETINGS.

THE publishers of this journal extend to its subscribers and advertisers the dual greeting of a Christmas-tide of Good Cheer and of a New Year throughout whose course the blessings of good health, of work in plenty and its hearty performance, together with the reward commensurate, will be the special portion of all.

THE BUSINESS OUTLOOK.

IN these closing days of the year 1913, there exists considerable divergence of opinion relative to the arrest of the trade depression tendency and to the prospects of relief from the prevailing money stringency. Canada, of course, is not alone a victim with respect to these matters, her peculiar situation as a new country in process of populating and development being more or less responsible, due to her necessary dependence for capital with which to open up her agricultural and mineral resources, and her need of the products of other countries to effectively and economically prosecute the work.

Forecasting the immediate future is after all largely guesswork, at the same time there is considerable fascination in the exercise, and no great harm, but much good usually accrues, except when pessimism is played for the sake of notoriety. The progress of the past year is such as to inspire optimism in all of us, and it is worthy of note that the record of growth and development which each succeeding twelve months is piling up makes more stable our foundations commercially, and consequently less susceptible of outside influences.



THE SHIPPING DISASTERS OF 1913.

DESPITE the marked progress which the present year bears on its records, shipping disasters, particularly on our ocean coasts and inland waters run abnormally high in number, loss of life and material cost. In the broad sphere of the world's shipping, no such tragedy as that of the Titanic leaves its mark on the pages of the closing year, yet who shall say that much of the present record may not unreservedly be charged to preventable account.

We cannot get away from the fact that incapacity and carelessness have contributed in some cases to bring about the undesirable, but while this is so, it must be borne in mind that those responsible for the navigation of our lake and ocean craft may not always be blamed, neither can they be. The recent series of disasters on our Great Lakes is still fresh in our minds, particularly the hideous and shameful loss of life which were their accompaniment, and amid all the possible and impossible theories propounded and expressions of opinion given as to why so many lives were snuffed out and so many vessels disappeared in the waters of Lake Huron, no semblance of imputed incapacity or carelessness has been put forward relative to the men responsible for the navigation and propulsion of the ill-fated ships.

Is it possible that our Government reckons that because fewer lives are lost, comparatively, in matters marine than are lost in railroading or some special branch of manufacturing, that regulations governing the construction and loading of vessels, provision of adequate harbor accommodation, and efficiently equipped life-saving and signalling stations are of no immediate necessity. We believe the recent tragedy on Lake Huron was largely, if not wholly, preventable, and bears a charge of criminal negligence in some directions.

Politics in this as in every other sphere of our country's being dominates the situation. It makes party indebtedness an adjunct of necessary development, thereby overlooking the general welfare and ignoring right and justice. The disasters on our shores during 1913 call for action in the coming days, to at least minimize, if not prevent their recurrence, and while our rulers may be but a reflection of ourselves as a people, there is demanded of us and them that some honest attempt be made as early as possible to bring about a readjustment of and improvement in the conditions under which our mariners operate and our merchandise is transported.

TURBINES OF THE "AQUITANIA."

JOHN BROWN & Co., Clydebank, Glasgow, have now got the huge turbines on board the new Cunarder. These are the largest marine engines ever made. The total weight being about 1,400 tons. Each low-pressure turbine weighs about 425 tons. There are over 1,000,000 turbine blades, which vary in length from 1½ in. to 20 in. Thousands of pounds have been spent in experimenting, and full use has been made of the experience gained by the Cunard Company in the construction and running of their other turbine ships—the Carmania, Lusitania, and Mauretania.

In the case of the Aquitania an exceptionally high degree of economy is maintained by passing steam successively through high-pressure, intermediate, and low-pressure turbines to the condenser instead of, as formerly, direct from the high to the low-pressure turbines. This ensures more work from the steam. Another special feature is the arrangement made for going astern. Each of the four propeller shafts has an independent turbine for this purpose, the two outer shafts being driven by separated high-pressure turbines and the two inner shafts by low-pressure turbines included in the casings of the two low-pressure ahead turbines. This arrangement means the saving of an unusual amount of engine-room space, and permits a most convenient disposition of the starting platform.

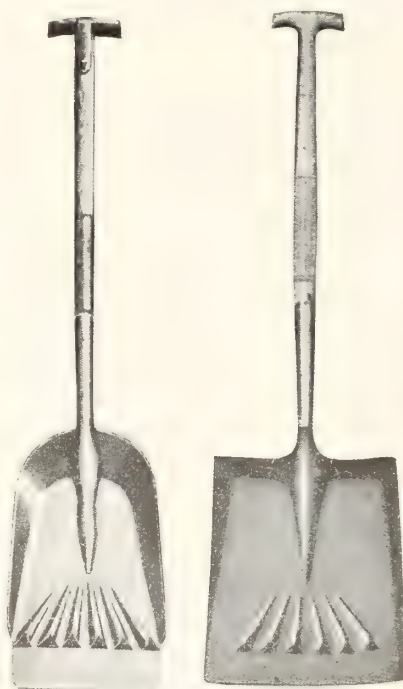
SPRINKLING SHOVEL FOR BOILER FIRING.

IN the September, 1912, issue of The Power House there appeared an article, entitled "Improved Hand Firing," the substance of which was the adoption for steam boiler firing purposes of a special type shovel designed to sprinkle the fresh fuel over the fire grate. Mr. C. A. Fell, Sheffield, England, a specialist in the subject of fuel economy, developed this particular type appliance, and it is of interest to know that George A. Marshall, 70 Lombard Street, Toronto, is distributing agent for it in Canada.

By means of the fan-shaped projection on the firing surface of the shovel, the fuel is spread so finely over the fire that the gas is driven off suddenly and ignites very quickly. In this way the furnace temperature is kept up to a maximum and so far from an extra supply of air being necessary, the draught may be lessened by partly closing a damper. The shovel is designed to get a similar effect as with a mechanical stoker of the sprinkling type, and thus the amount of steam generated in the boiler is increased by the sprinkling action without the necessity of going to

the high first cost of the mechanical stoker. This is particularly advantageous in districts where manual labor for stoking is cheap, while the cost of buying, transporting and erecting a mechanical stoker would be correspondingly heavy.

It may be argued that the fire needs firing oftener, and, therefore, the fire door has to be opened oftener, but the door is not kept open for such long intervals at a time owing to a less number of shovelful being necessary to cover the fire. Further, owing to the thin layer of fire used, it is not necessary to open the fire doors so often for raking, slicing and poking. Again, as less draught is necessary, there is obviously a less quantity of excess air drawn through the flue when the fire



SPRINKLING SHOVEL.

door is opened, and, therefore, the boiler and its setting is not cooled down to such an extent during the firing and raking operations.

This simple modification of the ordinary firing shovel is a distinct step in the direction of boiler economy, and has the additional advantage of training the fireman automatically in the production of a high rate of steaming.

THE NEW ALLAN LINERS.

THE sailing dates of the new Allan steamers Alsatian and Calgarian are now arranged. The first ship scheduled is the Alsatian, which was launched from the slips of the builders, W. Beardmore and Co., Dalmuir, on the 22nd of March, 1913. Her sailing date will be January 17, 1914, and it is con-

fidently anticipated that she will create a new Canadian record.

The Calgarian is scheduled to sail on February 28th next. This steamer is now completing at the Fairfield Shipbuilding & Engineering Co. yard, Govan. Both vessels are alike externally. These liners will be the pioneers of the "cruiser" stern in the Atlantic, and in the Canadian service the vessels are distinguished as being the largest in the trade. They will be propelled by four screws, driven by the latest type of Parsons turbines. The claims made on behalf of the cruiser stern will doubtless prove correct, and in any case there will be ample opportunity before next summer of testing the suitability of this form of construction. In the Navy, where steadiness and seaworthiness, under exceptional circumstances, are essential, this type has been universally adopted, and the protection afforded the steering gear and propellers will be valuable to merchant vessels as well as warships.

The sumptuous accommodation provided for the first-class passengers includes lounge, library, cardroom, verandah cafe, and gymnasium, while complete suites are provided for those who desire this privilege. The second and third-class accommodation also mark a great advance, and the management has every prospect of realizing the hopes expressed in the optimistic circular sent round to agents.

NEW SOO CANAL.

THE next great waterway scheme which the Government will carry out will be the new Sault Ste. Marie Canal. It is understood that an appropriation will appear in the estimates of the Minister of Finance to begin the work.

The new Soo Canal is part of the scheme of the Government to fashion a waterway from the Atlantic to the head of navigation on the Great Lakes, so that large ocean freighters will be able to carry their cargoes for the West from Europe and other parts of the world right to Port Arthur and Fort William, and, on return voyages, the freighters will carry wheat from Port Arthur to Europe.

The first section of the scheme is the rebuilding of the Welland Canal, making it thirty feet deep, and now that its construction is well on the way, the Soo Canal can be started next. The necessary land at Sault Ste. Marie was expropriated last summer by Hon. Frank Cochrane.

The hardest section of the undertaking will be the deepening of the St. Lawrence Canals, and this will be started after the Soo Canal is well on its way.

MARINE NEWS FROM EVERY SOURCE

Sarnia, Ont.—It is believed that Sarnia and Port Huron will join to purchase a fire tug.

Sarnia, Ont.—The new steamer *Noronic*, of the Northern Navigation Co. arrived in Sarnia recently to be fitted out during the winter.

Kingston, Ont. — The boilers of the steamer *Geronia*, are being removed and new water-tube boilers installed. She belongs to the R. & O.

Victoria, B.C.—A contract for the construction of a dump scow with capacity of 260 cubic yards, has been awarded to the Wallace Shipyards, Ltd., for \$8,475.

St. Thomas, Ont.—The Dominion Government will establish an automatic fog horn, to be operated by Hydro-Electric current at Port Stanley.

Ottawa, Ont. — The Marine Department officially closed the season of navigation on the great lakes by removing the men on the lighthouses on Dec. 11.

Ottawa, Ont.—The Government has awarded the contract for the ocean section of the terminal scheme to Foley Brothers, Welch, Stewart and Fauquier for \$5,208,743.

Fort William, Ont.—The passenger steamer *Athabasca* will enter the dry-dock for the winter. She will be thoroughly overhauled before the opening of navigation next spring.

St. John, N.B.—It was estimated that damage by the storm on Dec. 9, to the new wharf being built by Connolly & Charleson at Sand Point will reach a quarter million dollars. One wharf will practically have to be rebuilt.

Montreal, Que. — Captain Castle, of the Harbor Commissioners' floating crane, on Nov. 26, lifted the sunken government tug, *Maggie MacKay*, and placed her on a flat car ready for transportation. The tug weighed forty-five tons.

Ottawa, Ont.—Ulric Valiquette, supervising engineer of the Public Works Department, left November 27 for Esquimalt, B.C., to choose a location for the new dry-dock. It will be almost a complete duplicate of the dock now being constructed at Quebec.

Fort William, Ont.—James Laughlin sailed from Fort William Nov. 29, with the biggest cargo ever shipped on one boat from any port on the Great Lakes, namely, 589,104 bushels of oats. The South Murphy Co. were sole owners of the cargo, which was bound for Buffalo.

New Cunard Liner for Canadian Trade.—The experiment of the Cunard Company in regard to the Canadian passenger service has been very successful. They have placed an order for another vessel to be engaged purely in the Canadian trade. The vessel, which is to be called the *Aurania*, will be 520 feet long, 14,000 tons gross, and will carry second and third-class passengers only.

Montreal, Que. — The water in the Lachine Canal was let out December 20, instead of in the spring, just before the opening of navigation, as usually done. The announcement of this step, made by D. O'Brien, superintendent of the canal, was occasioned by the projected erection of a new power house which will supply the motive power for operating the sluice gates along the entire nine miles of canal from Montreal to Lachine.

Port Arthur, Ont.—The steamer *Noronic*, the new flagship of the Northern Navigation Company, has been delivered by the Port Arthur Shipbuilding Company to the operating company, and taken to Sarnia, where she will be furnished. This the Northern Navigation Company will carry out during the winter, and have her in shape for regular traffic at the opening of navigation next spring.

Fisheries Cruiser "Malaspina."—The fishery protection cruiser *Malaspina*, the first of the two vessels being built for the Dominion Government, dropped anchor in Esquimalt harbor on the morning of November 21, seventy-five days out from Greenock, Scotland. She made excellent time on her 15,000 mile voyage, via the Straits of Magellan, in spite of very rough weather off Rio de Janeiro, when the firemen had to work in water hip deep in the engine room.

Freedom of City of London.—A well-deserved honor was recently conferred

on Capt. Charles Edward Harwood, master of the *S.S. Narragansett*, that worthy mariner being admitted to the Freedom of the City of London. Prior to his being so admitted, Mr. H. E. Sparks, C.C., drew the attention of the Lord Mayor and Council to the fact that it was Capt. Harwood who rendered such signal assistance to the people on the burning *Volturno*, and that it was owing to his skilful and seamanlike action that so many lives were saved.

Ottawa, Ont.—There will be no suspension this year of the coastal regulations permitting United States vessels to take on cargoes at Canadian lake ports, winter there, and deliver them at other Canadian ports in the spring. This course was followed last season when the crop was late, and when a serious congestion developed in the handling of it. This year the figures show that it has been despatched with exceptional expedition, and it will be unnecessary to enlist the use of American tonnage for storage purposes.

Sarnia, Ont.—Winter docking facilities are very poor in Sarnia. The fact has been realized in marine circles for some time. It has cost Sarnia a lot of money and the town is awakening to the situation. Every boat that lays up at a port for the winter means so much money for that port. Sarnia, with proper wharf and moorage accommodations, could reap a good harvest in this respect and the news that the government intends to put through bigger and better plans for a harbor here has caused general rejoicing.

Diesel Electric Ship "Tynemount."—The "*Tynemount*," which is driven by an electric motor, the current for which is supplied from two Diesel-driven generators, is now lying in the Tyne, as it is too late for her to go into regular service on the Canadian lakes until next spring. It is understood that her trials have come up to expectations in the matter of speed, and her success or otherwise in service will be watched with much interest in this country. It will be remembered that the vessel was fully described in the October issue of this journal.

St. John's, Nfld.—The steamer *Cervona*, of the Cairn Line, coal-laden, from Shields for Portland, struck on the rocks near Renew's Head, Dec. 23, and was wrecked beyond probability of salvage.

Sarnia, Ont.—The Reid Wrecking Co., of Sarnia, succeeded on Dec. 11 in releasing the wooden steamer *Buckley*, aground at Harbor Beach. The boat is one of the three which ran ashore there during the big storm of November 9.

Sarnia, Ont.—The town council has leased the ferry dock to the Loughheed estate for an annual rental of \$100. The estate can now sublet it to the ferry Company, and, the town cannot prevent the latter from landing at the dock, as was done some time ago.

West Vancouver, B.C.—The contract for the new ferry was approved and ordered to be signed by the ferry directors at their meeting recently. The boat, which will cost \$22,700, is to be built by the Vancouver Shipyard. She will be 90 feet long, have 16-foot beam, and a capacity for 200 passengers.

Sarnia, Ont.—Congressman Crampton of Michigan, has taken definite action to induce the United States Government to survey and dredge a ship channel along the American shore of St. Clair River in this vicinity. As it is now, all boats have to follow the Canadian shore owing to shallow water on the other side. Both Canadian and American marine interests have been agitating for a ship channel on the United States side of the river.

Quebec, Que.—A company has been organized in this city with J. A. Fafard as president, to promote winter navigation in the lower St. Lawrence. The Company is called *La Compagnie de Navigation de Matane et Sept Isles*, and proposes to run a weekly steamer, winter as well as summer, from Matane, in connection with the Gulf Port Terminal Railway to Codbout, on the north shore, thence to Clark City, Seven Islands. The Company is asking for a mail subsidy and has the support of the Quebec Board of Trade.

For Safety at Sea.—The Canadian Department of Marine and Fisheries is drafting a new set of regulations for the steamship inspection service, with special reference as to life-saving appliances. The rules contemplated are to take the place of those embodied in the regulations for the inspection of steamboats, made under authority of the Canadian Shipping Act. By the proposed regulations, sufficient lifeboats must be carried by steamers to accommodate the number of passengers as indicated in the steamer license. The new set of rules will be applicable to lake as well as seagoing vessels.

GREAT LAKES ORE SHIPMENTS.

RETURNS from the eleven iron ore shipping docks on Lake Superior and Lake Michigan show that the total movement of Lake Superior ore by water in the season of 1913 was 49,070,500 gross tons, against 47,435,777 tons in 1912, an increase of 1,634,723 tons. Only a few cargoes were loaded after Dec. 1, most shippers having little ore to move after Nov. 20. The total shipments after Nov. 1 were 3,283,132 tons, while in 1912 they were 4,087,253 tons. Shipments to furnaces at Duluth and the various points at which charcoal furnaces are operated, together with those made from the Iron Ridge and Mayville mines in Wisconsin, were 785,000 tons in 1912, and have averaged about 800,000 tons in the past four years. If they reach that average in 1913, the year's movement will be 49,870,000 tons.

Shipments in gross tons, from the upper lake ports for the season are given below, together with a comparison with the three preceding years:

	1913.	1912.	1911.	1910.
Escanaba	5,399,465	5,234,655	4,278,445	4,959,726
Marquette	3,137,618	3,296,761	2,200,380	3,248,516
Ashland	4,338,230	4,797,101	2,429,290	4,094,374
Two Harbors	10,075,718	9,370,969	6,367,537	8,271,177
Superior	13,788,343	14,240,714	9,920,490	8,414,799
Duluth	12,331,126	10,495,577	6,934,269	13,640,166
Total—				
By lake	49,070,500	47,435,777	32,130,411	42,618,758
All rail		785,769	662,719	813,639
Total shipments		48,221,546	32,793,130	43,442,397

As for the past two years, Superior leads in shipments, the large total from that port representing the effort of the United States Steel Corporation to make up its minimum requirements under the Hill ore lease. Next year will also see heavy shipments from Superior over the Great Northern dock, on this account.

The Mesaba range this year reached a new high percentage of the total of Lake Superior ore. The Steel Corporation's percentage of the total was probably a trifle over 50. Its early season schedule for 1913 was about 26,000,000 tons, but this was reduced as conditions changed in mid-season and its final record was not far from 25,000,000 tons. In the past few years the Steel Corporation's percentage has ranged from 51 to slightly over 52.—E. & C.



Levis, Que.—The shipbuilding firm of George T. Davie & Sons has been acquired by George D. Davie, who will form a new company, to be known as the Davie Company, Limited. The Davie firm for years have been closely identified with shipbuilding and salvage interests, and operated the Levis graving dock. George D. Davie will, in all probability, be the president of the new concern, which will be capitalized at \$1,000,000.

Alsatian Does 20 Knots.—A Marconigram on December 19 from Chairman Allan, on board the new liner *Alsatian* in her extended speed trials, reports that the vessel made 298 miles in 14 hours 5½ minutes, an average speed of 19.91 knots.

Another New Cunarder.—The experiment of the Cunard Line in regard to the Canadian passenger service having been very successful, they on December 18 placed an order for another passenger vessel to be engaged solely in the Canadian trade. The new liner will be called "*Aurania*," and will be 520 feet long, of 14,000 tons gross register, and will carry second and third class passengers.

Collingwood, Ont.—The Collingwood Shipbuilding Company launched the new steel steamer "*Pelee*," for the Windsor & Pelee Island Navigation Co. on Dec. 20. The principal dimensions of the vessel are: Length, 146 feet; beam, 24 feet; depth, 18 feet 3 inches to the pro-

menade deck. The propelling machinery consists of a set of triple-expansion jet-condensing engines, supplied with steam from one Scotch marine boiler.

Scottish Shipbuilding.—From all the Scottish shipyards there were launched, during November, 26 vessels, of 73,298 tons, as compared with 40 vessels of 71,658 tons in November, 1912. The November Clyde output was 68,992 tons. This is the fourth largest this year and the highest record for the month, while the total for the eleven months is about 40,000 tons higher than that of 1912 and only about 12,000 tons less than that for the twelve months of that year. The average size of vessels built has been much higher than in recent years.

Launch 280 Vessels.—Shipbuilding on the North-east Coast of England, including the Tyne and the Tees, has reached its highest record during the present year, 280 vessels representing a combined tonnage of 2,172,058 tons having been launched. The previous largest total was in 1906, when the combined tonnage of the vessels launched was 1,080,000 tons.

C.N.R. Atlantic Port.—The rumored sale of the Quebec and Saguenay Railway to the Canadian Northern Railway Company revives interest in the belief here that the C.N.R. may use St. Cath-

arine's Bay, a natural port on the St. Lawrence, to which a line could easily be built, as a terminus for its Atlantic liners in winter, and a stopping place in summer.

Safety at Sea Conference.—The Government Conference on Safety at Sea, now sitting in London is not considering the questions of load line and deck cargoes. These will be reserved for a future International Conference.

FIFTY-TWO MILLION BUSHELS AHEAD OF 1912.

FIGURES obtained from the Board of Grain Commissioners show that approximately 191,000,000 bushels of grain have been shipped from elevators at Fort William and Port Arthur. During the season of navigation from the

to the waterfront in easy shipments, which precludes any chance of congestion.

U.S. LIFE-SAVING RECORD.

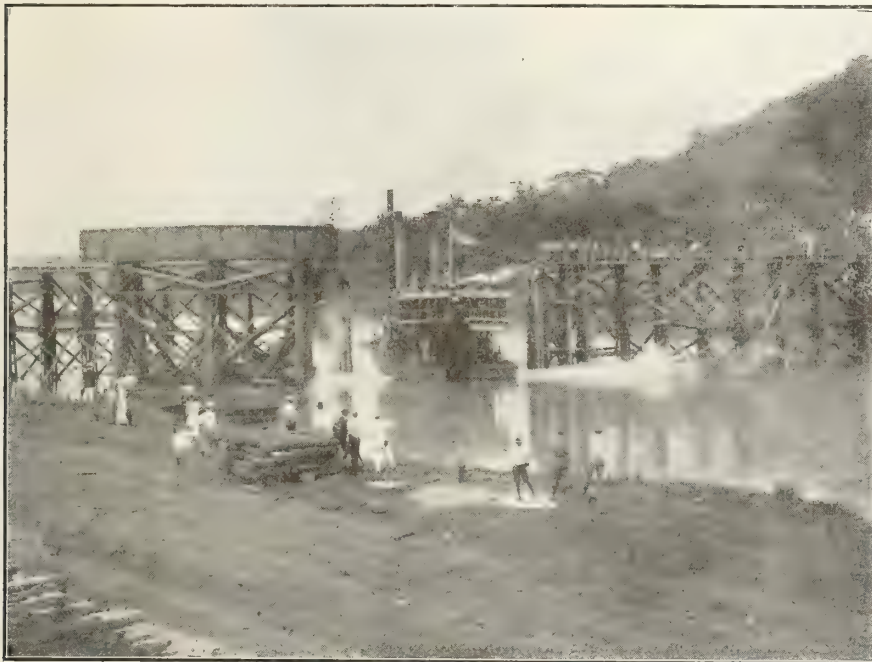
OUT of a total of 1,743 casualties at sea during the fiscal year ending June 30 last, the highest in the history of the life-saving service only 69 vessels were lost and 73 persons were drowned, according to the annual report of S. I. Kimball, general superintendent, which has just been made public.

Through the efforts of the service, vessels and their cargoes, valued at \$13,860,000, were saved. The crews of the service, with the assistance of revenue cutters and wrecking vessels, assisted 1,364 vessels valued, with their cargoes, at \$6,032,935, and carrying 5,168 per persons. The crews also warned 182 vessels that were running into dangers,

500 CANALS TRAFFIC, 1913.

REPORTS just issued by the engineers' office at Sault Ste. Marie, Ont., show traffic through St. Mary's Falls Canals for 1913 to be the highest yet carried. The total increase in freight is 7,245,668 tons, or 10 per cent. over the figures of 1912. Grain showed an increase of 63 per cent., or 43,205,823 bushels. The report follows:

Articles.	East-bound.		Total.
	U.S. Canal.	Canadian Canal.	
Copper, short tons	81,139	4,239	85,378
Grain, bush....	62,756,660	49,973,309	112,229,969
Building stone, short tons ..	481	5,700	6,181
Flour, bbls. . .	7,961,919	2,248,445	10,210,364
Iron ore, short tons	15,672,579	32,404,398	48,076,974
Pig iron, short tons	22,760	.....	22,760
Lumber, M. ft. B. M.	574,805	24,781	599,586
Wheat, bu. . .	72,619,194	132,202,313	204,821,507
G. merchandise, short tons .	333,388	69,680	403,068
Passeng's, No.	24,008	13,751	37,759
Articles.	West-bound.		Total.
	U.S. Canal.	Canadian Canal.	
Hard coal, short tons .	2,200,954	53,620	2,744,574
Soft coal, short tons .	12,271,253	3,607,111	15,878,364
Flour, bbls....	703	1,600	2,303
Grain, bush. .	400	.....	400
Manuf'd iron, short tons .	262,994	117,158	380,152
Iron ore, short tons .	.....	32,376	32,376
Salt, bbls. . .	650,858	79,573	730,431
G. merchandise, short tons .	761,849	605,943	1,367,792
Passeng's, No.	16,488	22,947	39,435



35½ K. Suction Dredge No. 85 passing through Bridge 57½, en route to Cucuracha slide. Oct. 25, 1913.

1st of September, 1912, until December 12, 127,000,000 bushels of grain have been shipped to the East. This is 52,000,000 bushels more than for the same period last year.

Of the thirty-two steamers wintering at the head of the lakes this year, eighteen are vessels of American lines. The approximate capacity of the entire fleet is 6,000,000. Already four and a quarter millions of bushels have been loaded into the hulls, and the remaining 1,750,000 bushels are expected to be loaded by the end of December. Elevators in the Twin Cities at the present time contain 14,000,000 bushels of grain, which leaves a storage capacity of 28,000,000 bushels yet to be filled. Grain is coming down

practically all of this work being done at night. It also extended aid to 288 vessels by furnishing emergency pilots carrying persons to and from ships to shore and caring for injured officers and men.

Of the total of accidents, small and undocumented motor boats comprise 68 per cent., more than two-thirds of all the persons exposed to danger from the sea being on board this class of craft. The danger in unskilled handling of small pleasure craft thus is shown to be excessive. The use of power boats instead of the old styled oared craft is recommended by showing that of the 4,096 persons endangered, 2,748 were rescued in the power boats.

GOLD MEDAL FOR BRAVERY.

THE gold medal of the Marine Engineers' Institute has been awarded to Sidney James McNally, one of the engineers of the C.P.R. liner *Empress of Ireland*, for bravery. The presentation of the medal was made before the *Empress of Ireland* left Liverpool on a recent voyage. The circumstances of the case as cited at the meeting of the Institute, at which the presentation took place were stated to be as follows:—McNally was the engineer-officer on watch on May 6, in mid-Atlantic, when the starboard high-pressure valve broke, carrying away with it the cover of the steam chest. There was an escape of steam at full boiler pressure of over 200 lbs. per square inch. Thanks to the pluck and presence of mind of McNally, who at once turned off the steam, disaster was averted which would have meant the death of probably every man in the engine room, and possibly the disablement of the ship as well.

To Winter at Collingwood.—The steamers *Agawa*, of the Algoma S. S. Co., *Glenmount*, of the Montreal Transportation Co., and *Meaford*, of the Farrar Transportation Co., have gone into winter quarters at Collingwood. The *Glenmount* is on the dry-dock for hull repairs, made necessary by striking a boulder at Depot Harbor on the last trip.

ASSOCIATION AND PERSONAL

A Monthly Record of Current Association News and of Individuals
who Have Been More or Less Prominent in the Marine Sphere

Mayor Baxter, of Vancouver, says that with the development of the harbor, an effort will be made to make the port a free one.

Commodore Captain Will MacNeill completed his 20th year as captain in the Donaldson Line on December 10, and at St. John, N.B., was given a silver entree dish by the officers.

Sir William Henry Bailey, one of the pioneers of the Manchester Ship Canal, and a director of the Company, died November 22, at the age of seventy-five. He was also a director of the Prince Line of steamships.

Adjutor Lachance was elected President of the Quebec Corporation of Pilots at a meeting of the directors held Dec. 11. Mr. Lachance, it will be remembered, resigned the position last summer, owing to a finding which the Wreck Commissioner's Court made against him in connection with an accident to a steamer of which he was pilot at the time.

Captain Clark, owner of the steamer J. T. Clark, has notified the city of Toronto that he is willing to accept an offer of \$5,000 per annum, providing he is given a five-year contract, to place a thousand gallon per minute pump on his boat, employ a day and night man, and to attend all fires on the Island or water front. The fire chief recommended the acceptance of the offer.

Captain Solomon Sylvester died at his home, 390 Manning Avenue, Toronto, December 21, after an illness of several months' duration. Captain Sylvester piloted boats until 1868, among which were the steamers Shickluna and Eurydice and the schooners J. G. Worts and St. Louis. In 1868 he retired from life on the lakes and organized a general wharfage and storage business in Toronto.

LICENSED PILOTS.

River St. Lawrence.—Captain Walter Collins, 43 Main Street, Kingston, Ont.; Captain M. McDonald, River Hotel, Kingston, Ont.; Captain Charles J. Martin, 13 Balaclava Street, Kingston, Ont.; Captain T. J. Murphy, 111 William Street, Kingston, Ont.

River St. Lawrence, Bay of Quinte, Murray Canal.—Captain James Murray, 106 Clergy Street, Kingston, Ont.; Capt. James H. Martin, 259 Johnston Street, Kingston, Ont.; John Corkery, 17 Rideau Street, Kingston, Ont.; Captain Daniel H. Mills, 272 University Avenue, Kingston, Ont.

OWEN SOUND HARBOR SAFE.

THE terrible loss of life and the wreck of so many fine vessels on the Great Lakes, and the facts that many of the disasters are directly attributable to the small number of good harbors available into which the distressed vessels might turn, and that the cargoes which many of them carried were destined for ports difficult of approach and affording the least protection, have been the prime causes of an agitation among the leading citizens of Owen Sound, Ont., to approach the Government with a view to the establishment of a national elevator at this point for the handling of a proportion of the annual grain rush.

One of the oldest and best known captains on the lakes said it was nothing short of criminal that ships should be sent to harbors which were of the most difficult approach, when Owen Sound harbor offered the easiest and safest ingress of any of the harbors on the Great Lakes. This is the opinion of marine men generally, and they cannot fathom the reason why if there are to be elevators of a national nature they should not be built largely here, purely from the standpoint of safety if for no other reason. With the knowledge that the safety facilities for vessels in Owen Sound's twenty miles of harbor should add weight to their arguments, the business men have already launched their scheme rather informally yet quite definitely, and will enlist the aid of the North Grey representative for Parliament, W. S. Middlebro, K.C., in the furtherance of their plans, and with a view to getting the ear of the Government. Already representations have been made to the proper departments at Ottawa in connection with the matter.

ASSOCIATIONS

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Chairman—W. F. Wasley, Gravenhurst, Ont.
Secretary—Jas. Morrison, Montreal.

INTERNATIONAL WATER LINES PASSENGER ASSOCIATION.
President—A. A. Heard, Albany, N.Y.
Secretary—M. R. Nelson, New York. . . .

THE SHIPPING FEDERATION OF CANADA
President—A. A. Allan, Montreal; Manager and Secretary—T. Robb, 526 Board of Trade, Montreal.

SHIP MASTERS' ASSOCIATION OF CANADA.
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Grand President.
Thos. Theriault, Levis, P.Q., Grand Vice-President.
Neil J. Morrison, P.O. Box 238, St. John, N.B., Grand Secretary-Treasurer.
Jno. A. Murphy, Midland, Ont., Grand Conductor.
George Bourret, Sorel, P.Q., Grand Door-keeper.
Richard McLaren, Owen Sound, Ont.
L. B. Cronk, Windsor, Ont.
Grand Auditors.

Directory of Subordinate Councils for 1913.

Name.	No.	President.	Address.	Secretary.	Address.
Toronto.	1	A. J. Fisher,	707 Bathurst St.	E. A. Prince,	59 Ferrier Ave., Toronto.
St. John.	2	H. E. Berry,		G. T. G. Blewett,	36 Murray Street, St. John, N.B.
Collingwood,	3	W. T. Rennie,	Collingwood,	Robert McQuade,	P.O. Box 97, Collingwood,
Kingston.	4	A. E. Kennedy,	395 Johnston Street,	James Gillie,	101 Clergy St., Kingston, Ont.
Montreal,	5	A. F. Hamelin,	3210 Le Tang Street,	O. L. Marchand,	St. Vincent de Paul, P.Q.
Victoria,	6	Alex. McNivern,	P. O. Box 234.	Peter Gordon,	808 Blanchard St., Victoria, B.C.
Vancouver,	7	Andrew T. Roy,	1212 Burrard St.,	E. Read,	859 Thurlow St.
Levis,	8	Helaire Mercier,	3 St. Joseph St.	S. G. Guenard,	Laizon, Levis, P.Q.
Sorel,	9	Geo. Gendron,	Sorel, P.Q.,	Al. Charbonneau,	P.O. Box 132, Sorel, P.Q.
Owen Sound,	10	W. Robertson,	1030 4th Ave. East,	Richard McLaren,	447 13th St., Owen Sound.
Windsor,	11	Alex. McDonald,	28 Crawford Ave,	Neil Maitland,	221 London St. W., Windsor, Ont.
Midland,	12	Jos. Silverthorne,		Jno. A. Murphy,	Midland, Ont.
Halifax,	13	D. J. Murray,	Victoria Rd., Dartmouth,	Chas. E. Pearce,	Portland Street, Dartmouth, N.S.
Sault S. Marie,	14	Thos. O'Reilly,	153 Queen St.	Geo. S. Biggar,	43 Grosvenor Ave., Sault Ste. Marie.
Charlottetown,	15	J. F. McGuigan,	38 Queen St.	Lem Winchester,	302 Fitzroy St., Charlottetown, P.E.I.
Twin City.	16	Arthur Abbey	Fort William, Ont.	John A. Smith,	Fort William, Ont.

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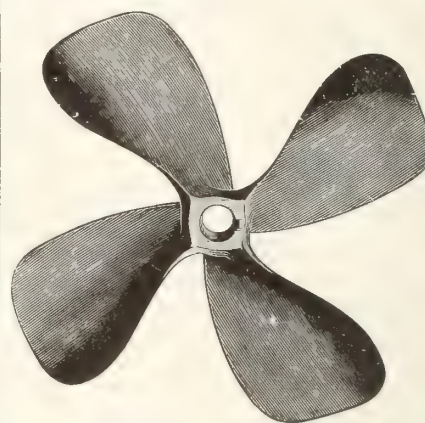
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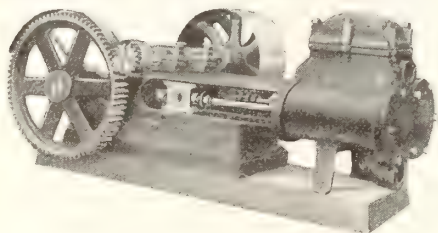


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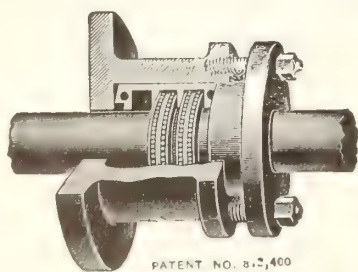
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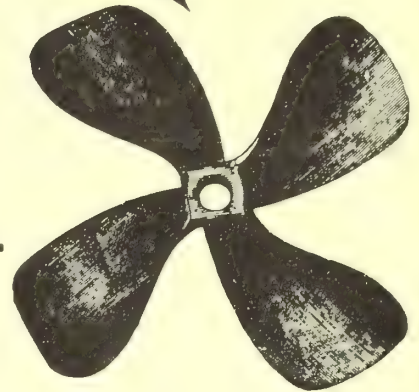
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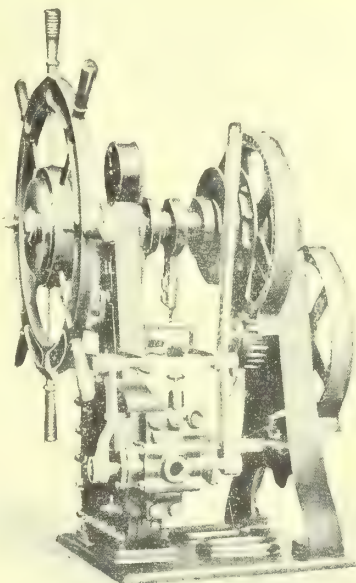
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